





M E D I C A L
Novus Tumbw's Liber
S K E T C H E S:
Ed. in 6 libra affine 125 lenti
I N T W O P A R T S.

By JOHN MOORE, M. D.

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WILLIAM LOCK, Esq;

DEAR SIR,

THE First Part of this Work was begun at your seat of Norbury Park, where Nature and Art are so finely combined, and the charms of social intercourse and retirement so happily united. It was natural, therefore, to think of inscribing the work I was then planning, to the person whom so many circumstances, and all the surrounding objects, presented to the mind. And, as the *subjects* of these Sketches are highly interesting to humanity, those who have the happiness of your acquaintance will readily perceive the propriety of addressing them to you.

By this testimony of my regard, however, I am conscious that I sacrifice

fice your dislike of public attention
to the indulgence of my own pride,
in subscribing myself, with the greatest
sincerity,

DEAR SIR,

Your affectionate friend,

and humble servant,

J. MOORE.

Clifford-Street, }
April 15, 1786. }

P R E F A C E.

THESE Sketches were originally undertaken on the following occasion : *A near relation* of mine, who has the justest claims to my affection and esteem, had the health of a considerable detachment of the foot-guards entrusted to his care at a very early period of life. They were ordered to reinforce the army at that time in Virginia, under the command of Lord Cornwallis. Anxious to perform that duty with all the efficacy in his power, he requested me to give him in writing a few observations and general rules relative to the nature and treatment of the diseases most likely to occur during the passage, and while the party remained separated from the army.

I accordingly drew up a hasty compendium or practical treatise on sundry diseases, beginning with fevers, adding such directions as I imagined might enable him to decide in various exigencies with greater promptitude and accuracy. Since his return to England I have bestowed some pains in improving several of those rude draughts, particularly those upon fevers, which from a few general ideas and detached practical hints have swelled to the size in which they now appear.

The observations with which I furnished him on some other diseases are also considerably enlarged : Whether I shall ever hazard their publication, is a point on which I am as yet undetermined.

The

The Seven Sketches, which form the First Part of this Work, were afterwards composed upon other occasions. They are attempts to explain in familiar language certain processes continually carried on in the animal œconomy, which are not only curious in themselves, but essential to life; and surely as interesting to mankind as any other part of natural philosophy. They may therefore be considered as no improper introduction to the Practical Essays which follow; but which, after all, I present to the Public with great diffidence, being conscious that dogmatic confidence in our own opinions never stands upon more slippery ground, or is more exposed to ridicule, than when those opinions regard the art of medicine,

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MEDICAL

M E D I C A L S K E T C H E S.

I.

ON THE PRACTICE OF MEDICINE.

IN the investigation of medical, as in that of some other interesting subjects, the mind is apt to remain in a disagreeable state of doubt and suspense, which is often augmented instead of being removed by farther study and experience.

The opposite systems of medical writers, the difference in the practice of living physicians, and the different effects which seem to flow from the same practice, must naturally produce doubt in a sensible and unprejudiced mind, and are strong proofs that the art of medicine itself is uncertain and conjectural.

There are indeed physicians who imagine they fully understand the nature of every disease; who have high and enthusiastic notions of the powers of medicine, and are never disturbed with doubts or diffidence of their own peculiar sagacity in the application of those powers. Whatever may be the opinion of the multitude, men of real penetration, who understand character, imagine that those of the above description are commonly found among the weak,

the ostentatious and superficial, and seldom or never among the acute and intelligent. Great confidence in the power, and belief in the effect of medicine, they think, are the offspring of ignorance and credulity ; and that acute reflection and experience, while they inform us what art can really do in the cure of diseases, also teach us what is the work of nature only ;—the effect of which generally is, greatly to moderate our faith in the miraculous powers of the former.

It must be acknowledged, that few things can be more irksome to a mind eager in the pursuit of truth, than a state of constant scepticism. Irksome as this state is, however it does not lead to such gross absurdity and such dangerous error, as too great confidence in our own superior lights, implicit faith in any particular system, or an eager belief in facts, without repeated experience, and the most cautious examination.

In tracing the annals of medicine, we find that many doctrines now exploded, and proved to be erroneous, were once supported by men of the highest medical authority. One would imagine such examples would cure the most presumptuous of a dogmatical reliance on their own particular opinions ; especially as their mistakes and errors affect the lives of others.

This is one benefit which the medical student may derive from making himself acquainted with the various systems which have prevailed in different ages and countries, although now they bear no authority. To study the revolutions of medicine, and know how long each opinion bore sway, by what means it was deposed, and what succeeded and reigned in its stead, is, on various accounts, expedient. However false ancient theories may be deemed, many of them are highly ingenious ; by endeavouring to comprehend them,

them, the mind is habituated to investigation, and strengthened by exercise ; we discover what led men of great sagacity into error ; such discoveries serve as beacons to prevent us from steering the same course.—Amidst the froth of false theory, many useful hints and observations may be found ; for it often happened that the practice was good, even when the reasoning was founded on false principles.

But although it is an ornamental, and in some degree an useful part of knowledge, to be acquainted with the various opinions that have prevailed in the medical world, it must be confessed that reasonings *à priori*, and systems founded upon them, have seldom led to the cure of diseases. For that essential part of the art of physic, we are indebted to the observations and facts regarding the symptoms and progress of diseases, and the effects of remedies, that have been collected in the course of ages by men of diligence, acuteness, and integrity. Those, when separated from that chaos of indigested observations, pretended discoveries, and false facts, which are also on record, render the art of medicine, when practised by men of sense and integrity, a blessing, and not a curse, to mankind.

It will be said that the powers of those medicines, which are found most effectual in the cure of diseases, were not discovered by men of uncommon sense and penetration, but some by mere accident, others by ignorant savages, and others we owe to the chymical enthusiasm of a credulous age, which, hot in the pursuit of the philosophers' stone, stumbled on discoveries in medicine and other arts, far more beneficial to mankind than the object they pursued, even had they obtained it ; but that few discoveries of this nature were made by men of science in consequence of study and reflection.

There

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'There is no denying this assertion, and the reason is plain :—When the most profound sagacity is exerted on subjects beyond its reach, it is on a level with the grossest stupidity : All the sense and learning in the world cannot *& priori* find out the qualities of any simple or mineral whatever. If the roots of rhubarb and ipecacuanha were produced to an assembly of physicians or chymists, who had never seen or heard of them before, they never could, by any reasoning, examination, or process whatever, discover, that the one is possessed of a purgative, and the other of an emetic quality ; or if they were told that each was endowed with one of those qualities, all their skill would be baffled in attempting to ascertain which was the emetic, and which the purgative.

There is but one way of discovering the qualities of those or any other drug, which is by trying its effects on man or some other animal. But although the most stupid of mankind has the same power with the most sagacious of making the experiment, the latter will, when it is made, turn it to more useful purposes. His superior talents will then come into play ; by reflecting on the symptoms of diseases, the means which nature sometimes takes to relieve or terminate them, and the analogy between one disease and another, he will apply the powers discovered in the two plants more judiciously, and with a greater probability of success to the cure of distempers.

The earliest practitioners in medicine, having no recorded facts or rules to direct them, formed the one, and collected the other, by a diligent attention to nature.—They observed an instinct in dogs and some other animals, that directed them to particular herbs, which seemed to relieve them in sickness.

Melampus, a Greek, one of the earliest who attempted to cure diseases, is said to have discovered the cathartic quality of hellebore, by observing its effects

fects on goats. By the use of this medicine, and of cold baths, we are told he cured the daughter of Poetus, King of Argos: And afterwards he is said to have cured Iphiclus, one of the heroes who had attended Jason on his argonautic expedition, of impotency, by giving him the rust of iron in wine. We are not particularly informed how he came to the knowledge of the cold bath, or of iron; but we may naturally imagine, that he might discover the strengthening effect of the former, by what it produced on himself and others when used for pleasure: The virtues of iron he must have found out in some such accidental way as he did those of hellebore.—A young woman, labouring under the chlorosis, or a man under a tabes of a peculiar kind, may have drank wine or some other liquor accidentally impregnated with iron, and received benefit from it; reflection and reasoning from analogy might induce him to make various trials, till he applied them at last in the successful manner above mentioned.

In certain debilitating distempers incidental to both sexes, what could a modern physician use, more efficacious than steel and the cold bath?

Thus from the earliest accounts we have of the practice of medicine, we find that experience and reasoning went hand in hand. They cannot be separated without the most fatal consequences; for it is not more absurd to imagine, that cures for diseases are to be discovered by dint of reflection only, than to imagine that we can make a proper use of experience and observation without sound reasoning.

The ancients not only observed the effects of that instinct by which brutes are directed to certain plants for relief when they are unwell, and then applied them to the complaints of men, but they also attended with diligence to the manner in which nature, when left entirely to herself, relieved or threw off

diseases. They perceived that certain disorders were carried off by spontaneous vomitings, others by looseness, and others by augmented perspiration ; and having thus learned how diseases were cured by nature, whenever her powers seemed too weak and tardy, then, and then only, they ventured to assist her by art.

Here it is worthy of observation, that although that sensation or instinct by which some animals are prompted to select particular vegetables for the removal of disorders, is not given in so strong or particular a degree to man ; yet nature often directs him also, though in a more general way, to the best method of relieving his complaints. In fevers, the patient generally has a desire for cooling, light, acent drink, and dislikes those which are of a heavier and more heating nature : He covets juicy ripe fruits of various kinds, and nauseates animal food ;—a free stream of air, and a spacious cool bed-chamber, are equally salutary and agreeable to him ; while confined air, and a small heated room, are pernicious and oppressive. In those instances, what the sick person shews an aversion to, has a tendency to promote the disease ; and what he relishes, has an effect in abating its violence. Other instances of the same kind might be enumeratd ; I will confine myself to one, which I have frequently had occasion to observe.

Towards the end of very bad putrid fevers, when the patient, exhausted by the violence and length of the disease, lay constantly on his back, had continual startings in the tendons of the wrists ; his lips and teeth being covered with a black crust ; his tongue trembling, and with difficulty held out ; the pulse weak and quick ; in this deplorable condition, when the patient seemed insensible to every thing else, he rejected, with every mark of aversion that was in his power, medicines of every kind ; but upon his lips and tongue being moistened with wine, he sucked it

in with avidity, although he could not open his teeth so as fully to admit a tea-spoon.

On perceiving this, as he would take no other cordial, nor any thing else, he was indulged in the wine, although the relations were often under great apprehensions that it might have a pernicious effect, till they saw the strongest evidence to the contrary.

In cases such as that above described, I have seen wine produce effects infinitely more beneficial than all the cordials and alexipharmics of the shops put together.— That quantity of wine, which in perfect health might have occasioned intoxication, in this weakened and exhausted condition tended only to fill and strengthen the pulse, diminish the trembling and subsaltus, diffuse a genial warmth over the skin, and so far from increasing, evidently abated the stupor and tendency to delirium, and saved the patient from the very jaws of death ; yet the salutary effects of this powerful cordial in such cases are discovered by the desire with which nature inspires the patient for it, in preference to every thing else.

A return of appetite is always a favourable sign in a fever ; and it has been remarked, that if the patient expresses a desire for that aliment to which he shewed a particular aversion during the former course of his disease, it is still more favourable ; and if he continues to beg, with persevering eagerness, for a little animal food, whether fish or flesh, he may, with caution, be indulged ; for the food he so earnestly requires, though not precisely what the physician would have recommended, seldom disagrees with him.

When human reason is clouded by disease, it appears as if nature inspired the sick with a temporary use of the instinct of other animals ; and those physicians seem destitute of both reason and instinct, who on every occasion refuse to gratify them with what nature so strongly indicates.

While we admit that experience and observation are the surest guides in the practice of medicine, it must be granted at the same time, that to make judicious experiments and accurate observations, to draw just inferences from what we observe, not to confound the effects of one cause with those of another, and to apply our experience and observations to the best purpose, is not easy, nor so common a thing as is usually believed.

We hear people every day, in talking of their physician, use language of this kind—"I own he is a very weak, silly man, but he has had a great deal of experience;"—or, "I grant you, he is an ostentatious, parading coxcomb,—next to a fool indeed in other respects, but he is an excellent physician." They seem to think that common sense diverts a man from the study of his profession, like the French lady, who being told that her physician had not common sense, replied, "So much the better; how can a man, who spends his time in studying common sense, learn medicine, Monsieur Abbé?—He who talks Greek like Homer, does not know how to dance."

There never was a greater absurdity, however, than to suppose that a man of an uncommonly weak understanding can be a good physician; he may indeed have a great deal of experience; he may possibly be even a man of learning; but without natural acuteness and good sense there never was a good physician since the world began; the thing is literally impossible.

What is the business of a physician?—Why, to apply his knowledge and experience to the cure of diseases, in which he must be directed by that degree of understanding he possesses; and if he is deficient in sense, his experience will prove a source from which he will draw false inferences; and learning, if he

he has it, will make him more presumptuous, and lead him farther into error.

How many practitioners do we meet with, who are convinced that fevers are cured by the draughts impregnated with contrayerva root and cardiac confection, with which they tease the patient every two or three hours :—And how are they convinced of this? They will answer, from experience; for the drugs not having actually killed the patient, but only retarded his cure, he recovers at length, notwithstanding all the draughts he has been obliged to swallow; the sagacious doctor imputes the cure to his own prescriptions, and perhaps publishes the case for the benefit of posterity.

I have known a very well-meaning man mistake a prescription of feeble efficacy for one of the most powerful febrifuges that ever was contrived; he had ordered it probably at first when the disease began to take a favourable turn, or immediately before a happy crisis took place, and imputed the whole effect to the prescription.

He gives the same medicine in another instance or two, on the very day the fever commences; it is an ephemera*, and he is confirmed in his opinion of the power of the medicine, he proclaims it the happiest combination that ever was invented, which by a kind of elective attraction draws the morbid matter to itself, and then hurries it out of the body. After a few instances of this kind it is impossible to open his eyes; he imputes the unfortunate termination of other cases to some latent cause which opposed the salutary effects of his favourite medicine. That any man, particularly a man of letters, and bred to the practice of physic, should be so easily deceived, could scarcely be believed, if we did not see such examples frequently, and if we did not know with what partiality mankind in general

* A fever that begins and ends in the compass of one day.

general view what they consider as their own inventions, and with what complacency they embrace opinions which flatter their own judgment.

Another thing which prevents some practitioners from knowing the futility of their own prescriptions, and what nature left to herself can do, is, that they never leave nature to herself. The instant they are called, they fall to work with their draughts, juleps, and apozems, and persevere with unrelenting assiduity till the disease terminates one way or other; if the patient recovers, the medicines get the credit; if he dies, the disease is thought to have been incurable.

The being teased to swallow drugs, is a species of distress to which the rich are more exposed than the poor, provided the latter keep out of hospitals. *Nature* is allowed to cure as many of them as she can, and *Art* being little solicitous of seducing such patients out of her sister's hands, they generally have *real* need of medicines before they are pressed to take them. But a physician whose practice lies among the highest spheres of life, if it amounts to three thousand pounds yearly, is supposed, at a moderate computation, to receive two thousand five hundred of that sum for prescribing for imaginary complaints, or such as would have disappeared fully as soon had they been left to themselves. But this ought not to be imputed as a crime to the physician; if an old lady cannot dine with comfort till he has felt her pulse, looked at her tongue, and told her whether her chicken should be roasted or boiled, it is reasonable he should be paid for his trouble.

The difference between a good physician and a bad one is certainly very great; but the difference between a good physician and no physician at all, in many cases, is very little.

If during the course of the common epidemic diseases which occur in this island every spring and autumn,

tumn, two hundred patients were taken promiscuously, and one half delivered to the care of the faculty to be treated according to art ; that is, as private patients by whom they are fee'd every time they prescribe ; and the other half delivered to the care of nurses, instructed to give them no physic whatever, but merely cooling drinks, and such light and simple food as the patients' appetites might lead them to wish for, I am convinced the world would be a good deal surprized at the result of the experiment.

It is astonishing how exceedingly apt medical practitioners of every denomination are to impute to drugs that salutary effect which proceeds from the universal influence of another cause, which cause is that inherent bias observable in the animal œconomy to restore health ; for as the surface of a lake which clearly reflects the sky and hills and verdant scenes around its borders, when it is disturbed by the falling of a stone, immediately endeavours to recover its scattered images, and restore them to the same beauteous order in which they are wont to appear ; in like manner when the natural course of the animal œconomy is interrupted and disturbed by disease, the powers of the constitution are continually endeavouring to restore its organs to the perfect use of their functions, and to recover its usual vigour and serenity.

This *vis medicatrix naturæ*, this constant tendency in nature to overcome disease and restore health, was observed by the father of medicine ; and a sentiment to the same purpose is the very first expressed by Sydenham in his inestimable work, and is acknowledged by all candid and discerning practitioners, to have a powerful influence in the cure of diseases. Indeed I am inclined to believe that physicians, in proportion to their candour and discernment, acknowledge and rely upon this power in

in nature ; and in proportion to their selfishness and weakness, impute every recovery to their own prescriptions."

A judicious and experienced physician considers himself merely as an assistant to nature ; when her force seems to be sufficient, he leaves her to perform the cure ; when she seems too feeble, he assists her by every means in his power. His patients, therefore, are sure, in the first place, of all the aid which nature can give them ; and as often as it is requisite, if art has discovered or invented any thing to alleviate or remove their complaints, they are sure of that also.

Whereas a physician who has an overweening conceit of his own powers and those of his art, is apt, by unnecessary and officious attempts, to interrupt the salutary process of nature, and like the inconsiderate man who would plunge his hands into the disturbed lake, in order to assist its efforts to regain its lost tranquility, he only helps to increase the disorder and confusion he means to remedy.

If well-meaning practitioners, who really wish to do every thing in their power for the recovery of their patients, and whose greatest errors proceed from thinking more in their power than there is, can do so much harm ; how much greater mischief is to be dreaded from the number of cunning, unprincipled, interested practitioners in medicine, who, without being deceived themselves, impose upon the weakness and credulity of others ? Those generally are men of superficial knowledge, of a considerable degree of natural shrewdness, and such a portion of impudence, as sets them above embarrassment, even when their ignorance and fraud are made manifest.

Such men study the foibles of mankind, fatten on the fears and hopes and caprices of the rich valetudinarians,

valetudinarians, and squeeze the last lingering shilling out of the weakened hands of the poor.

There is a kind of quackery which some people seem to invite ; they cannot be fully convinced of their physician's skill and attention without it.—Proofs of this are to be met with every where : In a certain city on the continent I happened to call upon a lady, who, on account of a pain and slight swelling in her ankle, had consulted a well-known physician, who, although he is accused by his brethren of much charlatanical parade in his practice, commands the admiration of his patients in a more supreme degree than any doctor I was ever acquainted with. He had just left her when I entered : She told me he had ordered a poultice of bread and milk to be applied to the part, and then giving her watch to her maid, she desired her to take particular care that the poultice should be boiled exactly *four minutes and a half*, for such were the express orders of Monsieur le Docteur. On my expressing some surprize at the minuteness of these orders, she exclaimed, “ My God, what precision ! he calculates like an angel ! ”

The fortunes that have been made, and are still making, by men of this description, in the cities of London and Paris, and by the venders and inventors of nostrums or secret and infallible cures, are quite astonishing. I mention Paris and London particularly, because, though other towns are, in some degree, exposed to the same evil, yet the reputation of those pretended cures is always highest where the field for imposition is widest, and the chance of detection least.

This I take to be the case in the largest and most populous cities, where physicians as well as nostrums without merit have a far better chance of being esteemed than in smaller cities, where the real value

lue of each must be known to a greater proportion of the inhabitants. Accordingly we find that hardly any of those vaunted medicines of the capitals support their reputation for any length of time in the provincial towns, because the citizens are all in some degree acquainted with each other, and with the circumstances of each case in which the medicine is used ; its real effects, therefore, are more fully known. Whereas, in such a town as London, a fair and candid investigation of the merits of a nostrum is as difficult as it would be fruitless ; for if the mistakes and forgeries brought in its support should be detected and published to-day, fresh evidence of new miracles would appear in the papers to-morrow, and the minds of the multitude would be divided. When modest reason pleads on one side, and assuming ignorance on the other, we may easily guess which will have the majority.

Besides, it is to be remembered that no man has such an interest in attacking as the nostrum-monger has in defending the character of his secret ; accordingly, most people, after they are convinced, either from their own experience, or from that of others, of the futility of the medicine, give themselves no farther trouble about it, but leave it to their neighbours to make the same enquiry or experiment, if they please.

This is precisely what the quack wishes, and if numbers *do* make the experiment, he gains his object ; when his fortune is made, the reputation of his drug will give him no more concern. But in case by any accident its character should be blasted before he has accomplished his object, he then metamorphoses his infallible pills into infallible drops, gets their praises founded, and their cures attested in the news-papers, and very possibly the drops will finish what the pills began.

It will be said that the attestations of cures are not always forgeries, for we sometimes find people of character allow their names to appear in support of the efficacy of quack medicines.

To this it may be answered, in the first place, that such instances are very rare, in comparison of the number of obscure and suspicious evidences which are brought on such occasions ; and we must recollect besides, that a good character, though it screen a man from the suspicion of being the accomplice, yet it cannot always save him from being the dupe of imposition.

In diseases which are liable to sudden transitions from extreme pain to perfect ease, and where there are long intervals between the paroxysms, it is not very difficult to persuade the patient, that he is entirely indebted to the nostrum for that abatement in his complaint which takes place at the time he uses it : Then gratitude to a supposed benefactor naturally prompts him to do every thing in his power to serve him ; and sometimes in the warmth of his zeal, especially when disputing with unbelievers, he is hurried into assertions concerning the effects of the medicine, which in cooler moments he would not have made.

The valetudinarian is often as fond of enumerating his complaints, as a soldier is of talking over his battles. And although he seldom finds a listener, who with a greedy ear devours his discourse, yet like the latter he tries to create an interest ; and to melt the heart by running through all his *disastrous chances, his moving accidents and hair-breadth 'scapes* *. It is his hint also to speak of some wonder-working nostrum, for it is a thousand to one but he has some favourite of this kind, which he strongly recommends, and having once recommend-

ed,

* Othello.

ed, he becomes a party concerned in its cause, he reads with pathos and energy every advertisement in its favour, he thinks his own truth and honour connected with the reputation of the medicine he praises, and imagines he gives the strongest testimony of his affection to his friends when he teases them to swallow a little; it is in vain they assure him they are in perfect health. "This drug can be taken with safety at all times; if the disease has arrived before it is taken, it removes it; if it is only on the road, it prevents its arrival."

By such means, many remedies which are secrets have been brought into vogue in the course of our remembrance; all of them attained a temporary reputation, which none of them could support for any length of time; they were raised to notice by the breath of imposture and the voice of credulity, they sunk into darkness by the intrinsic tendency of their nature.

One medicine must be excepted from the neglect and contempt due to so many others.—Dr. James' fever powder has for a number of years enjoyed a considerable degree of reputation in this island, and in the colonies connected with it, although in the continent of Europe it is little used.

In an hospital where I had the chief care of the sick for several years, I took frequent occasion to compare the powers of this medicine with those of antimony, James' powder being generally supposed to consist of a preparation of antimony and testaceous earth, or some other insipid powder, to disguise it. The antimonial with which I brought it most frequently into comparison, was emetic tartar, with whose operation and effects those of the powder seem to have a great resemblance; whether they are exhibited in full doses, so as to excite vomiting and purging; or in smaller doses, when they produce only an increased perspiration,

tion, a slight degree of nausea; and if the small doses are repeated at proper intervals, some evacuation by stool.

On the first threatening of fever, a full dose of James' powder operating at once as an emetic, sudorific, and cathartic, seems sometimes entirely to throw off the disease, and leaves the patient quite cool and free from fever; and in cases where the fever is formed, and has continued some time before the powder is administered, it frequently diminishes the force of the fever; and used in small doses as an alterative, is of service during the course of the fever.

All those effects are also produced by proper doses of tartar emetic, exhibited in the same manner. The principal difference seems to consist in this, that a full dose of tartar emetic operates, with more force and certainty, first as an emetic, and afterwards as a purgative, than a full dose of the powder, but the latter with most certainty as a sudorific; and it often appears to be as efficacious in removing or abating the feverish symptoms, although it operates with more mildness than the former.

When used as an alterative in small doses at considerable intervals, the fourth of a common dose of the powder is less apt to create a nausea, or to excite vomiting, than a single grain of tartar emetic dissolved in a saline draught; in other respects their effects seem so similar, that in fevers where I think antimony proper, whether at the beginning or during the progress, if the patient or his relations have a predilection for James' powders, and seem solicitous that he should have it, I very chearfully comply with their wishes.

It will be said, that if a full dose of James' powder is given as above mentioned, at the first threatening of a fever, although after its operation the patient should be found perfectly cool and free from fever,

ver, that is no absolute proof that the medicine removed or prevented one, because, very possibly, no fever was about to form ; for there is no certain criterion by which we can distinguish the first symptoms of a fever, which will last but one day, from those of one which will prove tedious and dangerous ; so that James' powder, when given at the first attack of such disorders, may get the credit of curing many complaints, which would have gone off as soon, and more easily, of themselves.

This observation is certainly just, but it is no juster when stated against James' powder, than against antimony, or any other medicine whatever.

Some physicians have such an aversion to every composition, the materials of which are kept secret, that they will on no account, and in no case, order them ;—they imagine such condescension beneath the dignity of the profession. Their dislike is, in general, well founded ; but I cannot help thinking there may be particular cases in which there is more wisdom *in the breach than the observance* of this general rule ; and as for the dignity of the profession, its chief dignity certainly consists in curing diseases in the speediest way possible.

In cases where the usual practice generally fails, or in which a medicine whose composition is kept secret has the reputation of acting with more efficacy than the known prescriptions, or even when the patient or his friends have a strong desire to try a particular medicine, which we know has been used in a thousand instances with safety, in any of those cases, obstinately to oppose the trial, merely because we do not know the precise ingredients of which it is composed, would, according to my judgment, be unreasonable. For let it be remembered, that although we have not a certain knowledge of the particular ingredients of the medicine in.

In question, yet we have a knowledge of its manner of operating, and its usual effect; this is the most material knowledge the physician can have. What more in reality does he know of Jesuits bark, rhubarb, or any other uncompounded medicine? The first is a medicine consisting of two or three ingredients, secretly mixed together by a physician of the name of James. The other two are medicines whose component parts are still more secretly, and in a manner less understood, combined and mixed together by nature. If then he prescribes the latter from a knowledge of their effects only, he ought not to reject all trial of the former, merely because he is unacquainted with the particulars of its combination.

Nobody can approve less than I do of the practice of keeping any prescription secret, which can be of public utility; but I cannot think that the inventors' not acting in the most liberal manner possible, is a good reason for preventing a patient's reaping the benefit of the invention.

The enthusiastic admirers of Dr. James' powder may consider what I have said above as but cold praise:—Others, whose authority is far greater than mine, will probably imagine I have gone too far, in putting it upon a level, in particular cases, with any preparation of one of the most powerful medicines in the whole *materia medica*. Be that as it may, what I have said proceeds from conviction founded on experience; however much therefore I am persuaded of the worthlessness of nostrums in general, I thought it fair to distinguish this from others.

I know it is often said by the advocates of other nostrums still in use, that they are condemned from interested motives only; that physicians, although fully sensible of their efficacy, decry them with un-

ceasing industry, lest coming into universal use, they should annihilate half the diseases of mankind, and spoil their trade.

Physicians, no doubt, have their share of that useful jealousy of trade which prevails in this country; yet I should think it rather a violent supposition to imagine them capable of carrying that spirit so far, as to allow their fellow-creatures, their relations and friends, to perish in torment, rather than recommend what would give them speedy and certain relief, merely because the cure was not of their own manufacture.

But I will not insist upon this argument, lest I should offend those who are of a contrary opinion, and think a jealousy of trade cannot be carried too far. Let us take the supposition therefore for granted, and admit that the whole faculty had entered into an agreement to stifle the reputation of a discovered cure for a disease, for which no cure was known before,—the gout for example. The plot would prove ineffectual: The influence of the whole faculty combined, and each individual adhering to the spirit of the confederacy, could not prevent such a medicine from coming into universal use, not in this island only, but, in spite of all their jealousy of trade, even in Holland, and all other countries *.

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* Sir George Baker has lately, in a very curious and instructive paper, shewed by what degrees the reputation of the Peruvian Bark was established in Europe, in spite of all the prejudices and passions it had to encounter, all of which it has overcome, although it was first introduced by the casual experience of an uncivilized people, supported by a body of men who are not physicians, and never were popular, and its uses more particularly developed by a person to whom the physicians of the time gave the name of quack.—Vide *Medical Transactions by the College of Physicians*, vol. iii.

An improvement in surgery indeed, however interesting to humanity, might be kept down for a longer time, if we could suppose such an improvement would be discouraged by the gentlemen of that profession ; for as important operations seldom occur, and when they do, are generally performed in hospitals, where the patient must submit in all respects to the fancy of the operators, should they, from obstinacy, pride, or any other unbecoming motive, oppose the improvement, it would of course be greatly retarded in its progress.

But a thing so easily tried as a medicine, and which people in pain or in danger are so eager to make trial of, if it really possessed the virtues supposed, could not possibly be for any considerable time withheld from general use. Every day, every hour, would add to its reputation ; the best attested, spontaneous evidence of cures would come from all quarters ; every grateful tongue would proclaim the virtues of the medicine ; those who talked of nostrums and quackery, would be hissed into silence ; and the voice of falsehood and envy would be drowned by the general suffrage.

The practice of inoculation for the small-pox is certainly not for the interest of physic, considered as a trade. The present method was not introduced into this country by regular physicians, who are now seldom called to attend patients under inoculation, and who certainly have more reason to think this practice hurts their trade than any nostrum does ; yet no sooner were its great advantages known, than it began gradually to be adopted, and in a very short time became universal. I do not suppose that the physicians ever opposed it ; but if any body chooses to assert they did, still it must be granted that their opposition did not avail, which is all I am contending for.

Nothing can be more certain, therefore, than that all useful discoveries, whose pretensions can be brought to trial, will, in time, make their way in every nation, unless indeed they are accused of striking at the religion or government of the country. In England they would make their way notwithstanding, or perhaps the sooner, by their striking at both.

It must be acknowledged, that by the arts of fraud, imposture, and indefatigable puffing, very worthless drugs are sometimes raised to a reputation they do not deserve, in shorter time than is required to bring an useful discovery to the fame it highly merits; but then time is sure to support, confirm, and establish the latter, and gradually to shake, weaken, and at length totally to overturn the former. A stronger proof therefore needs not be given, that the vaunted nostrums of former times were undeserving of the character they enjoyed, than their having gradually fallen from eminence to neglect; whereas the virtues of Jesuits bark, mercury, and other valuable medicines, have become more and more manifest; and we see them daily extended to the relief of other complaints than those which at first gave them reputation. The prowess of such Herculean medicines as the two just mentioned, are sufficient to exterminate all doubt, and establish an universal reliance on their virtue in many desperate cases;—but without hinting at secret nostrums or drugs, artfully cried up for selfish purposes, there are medicines universally known and in daily use, about whose efficacy practitioners of the best intentions are of very different opinions, and yet both those who think favourably of these medicines, and those who despise them as useless, declare that they found their opinions upon *experience*.

The explanation of this ænigma is, that the medicines in question, though their powers may on some occasions be considerable, yet on others act very feebly, and in all cases slowly; by which means their virtues appear different, and sometimes are not discerned at all, but are entirely denied by people who have different powers of discernment, and who view them in different lights.

It requires more natural penetration and attention than many people possess, or are willing to bestow, to determine the genuine effect of particular regimens or courses of medicine. Besides natural acuteness and sagacity, it requires the exact weighing of every concomitant and collateral circumstance which can promote, retard, or prevent the effect of the medicine at the time it is administered. It is proper to make repeated trials, and on people of various constitutions. It is absolutely requisite to have no favourite hypothesis, to be divested of all partiality for or prejudice against the medicine, and in short to have no view but the discovery of truth. But when such investigations are begun by people already biased to one side or the other, or when carried on carelessly, we need not be surprized to find that the inferences are different, though all are said to be equally drawn from *observation*.

But as hasty and superficial observation often contributes to raise the reputation of very foolish prescriptions, so it sometimes tends to injure those of real utility. For the same strength of understanding which imputes salutary effects to the former, because they do not always kill, will impute pernicious ones to the latter, because they do not always cure.

One declares the bark never agrees with him; —another will suffer the most racking pain, rather than swallow any medicine, till he is assured there

is no laudanum in it ;—and a third will in no case take mercury in any shape or form.

All those people assert, and are themselves convinced, that those prejudices are wise conclusions, founded on the *experience* they have had of their own constitutions ;—very possibly those medicines have been given them on some improper occasion ; or when their complaint was augmenting, and could not be stopped as soon as they expected : But nothing can be more rash than to determine, because a medicine does not prove immediately successful, or because it has been ordered injudiciously, that it is improper in every future situation that can happen.

It will be said there ought to be great allowance made for the peculiarities of constitutions ;—that there are antipathies not founded upon reason, but which seem inherent in the constitution, which, on certain occasions, must have great weight with the physician.

Every thing of this nature ought doubtless to be duly weighed ; but I am greatly mistaken if there is any human body so framed as to render it improper in every possible case to give bark, or opium, or mercury. It frequently happens that the medicine reprobated by the prejudice of patients, is the only one which can give them effectual relief : Yielding to such prejudices, therefore, is a more dangerous thing than many people are aware of, and the patient ought to be reasoned out of them without loss of time, unless reason should unfortunately happen to be a thing which agrees with his constitution still less than any of those salutary medicines to which he shews such an aversion.

While we admit, therefore, that accurate observations are our surest guides, we must keep in mind that careless and partial ones are as apt to lead to error as hypothetical reasoning itself.

Examples

Examples are numberless; I will mention one where the error is as universal, and has continued as long as most: I mean the notion that the figures of animals of various kinds, and other extraordinary marks, are often stamped on the faces or bodies of the foetus in the womb, by the mere force of the mother's imagination.

On questioning the people thus marked, you are generally told, "that their mothers, while pregnant with them, were startled by the unexpected sight of a mouse, a rat, a squirrel; or that a cherry, a plum, a bunch of grapes, or something, in short, which resembles the mark, had been thrown at them: That this accident had given much uneasiness to their mother; and as soon as they themselves were born, the similitude of what had frightened her, whether animal, vegetable, or whatever it had been, was found as you see on their body."

Some years ago, I took a good deal of pains to investigate this matter: I conversed with a great number of women who either had such marks on their bodies, or on those of their children. They were all in the same story; the marks on their own bodies, they assured me, proceeded from something that had been thrown at their mothers; those on their children's bodies, from something that had been thrown at themselves, during the course of their pregnancy. But on close enquiry, and examining the relations and attendants, it appeared that the mother never had mentioned any thing of her having had a fright, or of her having an impression that her child would be marked, until she saw the mark; then indeed, and not before, she told them of some adventure which was the supposed cause of it.

This turned out to be the case in every instance I heard of, which could be fairly and accurately examined into.

When I heard of any woman who was actually pregnant, and had met with some accident that gave her a strong impression that the child would certainly have a peculiar mark, I watched the event; and the child, when born, was free from every appearance of what had made such impression on the mind of the mother.

In short, it always happened, either that the woman saw the mark first, and recollects afterwards what had occasioned it; or if she really met with some accident or fright during her pregnancy, and ventured to foretel that her child would be marked, she was delivered of her fears and her child together, for no mark was ever to be seen.

The case of one lady is so strongly in point, and was attended with such singular circumstances, that it is worth mentioning..

This lady, who had great aversion to monkeys, happened unfortunately, during the course of her pregnancy, to visit in a family where one of those animals was the chief favourite; on being shewed into a room, she seated herself on a chair, which stood before a table, upon which this favourite was already placed; —he, not naturally of a reserved disposition, and rendered more petulant and wanton by long indulgence, suddenly jumped on the lady's shoulders:—She screamed, and was terrified, but on perceiving who had treated her with such indecent familiarity, she actually fainted; and through the remaining course of her pregnancy, she had the most painful conviction that her child would be deformed by some shocking feature, or perhaps the whole countenance of this odious monkey.

The pangs of labour did not overcome this impression, for in the midst of her pains she often lamented the fate of her unfortunate child, who was doomed through life to carry about a human soul in the

the body of an ape. When the child was born, she called to the midwife with a lamentable voice for a sight of her unfortunate offspring, and was equally pleased and surprized when she received a fine boy into her arms. After having enjoyed for a few minutes all the rapture of this change to ease and happiness from pain and misery, her pains returned, and the midwife informed her that there was still another child.—Another ! exclaimed she, then it is as I have dreaded, and this *must* be the monkey after all. She was however once more happily undeceived ; the second was as fine a boy as the first : I knew them both ;—they grew to be stout comely youths, without a trace of the monkey in either their faces or dispositions.

Numberless other examples might be brought to prove the necessity of examining and sifting to the bottom, as often as such investigation is in our power, opinions, however long established, and however generally received ; for many are said to be confirmed by universal experience, yet upon minute and accurate enquiry, this universal experience turns out to be no more than universal rumour, founded at first on careless observation, and afterwards swelled by false and exaggerated facts. But before we adopt any opinion which is to have an immediate influence upon the practice of medicine, we ought not only to weigh and examine those facts which we receive from others, but we must also be exceedingly careful not to be led into error by those which we gather from our own observation. It is evident that the first may lead us into error, because they may be false ; and unfortunately the second, without attention and sagacity, may also lead us in error, although they must be true.

A young practitioner orders a course of medicines in a particular disease,—a rheumatic complaint we shall

shall suppose ; after this course has been continued for some time, the patient recovers : Well, here is a true fact, from which, if he concludes that the medicines have removed the complaint, he may be in an error.

He orders the same course again for the same complaint ; the patient grows worse. Here is another true fact, standing directly in opposition to the former : Well, what does the Doctor conclude now ? After those two cases, if he balances the one by the other, he might infer that the course of medicines had just an equal chance of doing harm or good. But a physician will not naturally reason in that manner ; having a partiality for the course he has prescribed, he will most probably remain persuaded, that in the first instance the medicines performed the cure ; and in the second, some peculiarity of constitution counteracted their effect, and made the patient worse.

And here he may be wrong again ; the medicines very possibly may have done neither good nor harm in either case, and the different events may have entirely depended on certain circumstances, which the practitioner unfortunately overlooked.—Perhaps a change of wind from east to west in the first case, and from west to east in the second ; or perhaps one patient's chamber was dry, and the other's was damp.

It cannot therefore be too often repeated, that every circumstance must be weighed and attended to with the most careful circumspection during the course of our experience, lest this very experience confirm us in error.

This shews how very preposterous it is to put reasoning in opposition to experience in the practice of physic, some degree of theory or reasoning being absolutely necessary to direct our experiments, and afterwards

afterwards as necessary to enable us to draw just conclusions from them, and to apply them usefully; not only in cases in all respects similar, but also in those which, differing in some particulars, still have a general analogy.

He who derives his medical knowledge from books alone, and whose exalted notions have not been moderated by experience, will practise medicine as the philosopher who declaimed on the art of war to Hannibal, would have commanded an army; he who has seen much practice without reasoning, as one of Hannibal's pioneers; and he, who to extensive experience joins the greatest natural acuteness and all the powers of reasoning, as Hannibal himself.

Yet some practitioners have been so much shocked and disgusted with the flimsy and fantastical theories which have been invented as a foundation for rational practice, that they explode almost every kind of reasoning in the practice of medicine.—“We trust,” say they, “to experience, and experience only: We know that Jesuits bark stops the fits of an ague; and that mercury cures the venereal disease: We therefore order those medicines in these diseases, without any farther reasoning on the subject.”

No farther reasoning would be necessary, if every disease made itself known by as certain symptoms as the two just mentioned; and if we had specifics as efficacious as the bark and mercury for each. This would unquestionably be exceedingly fortunate for mankind in general; and if those ingenious doctors who condemn all theory or reasoning in the practice of medicine, are aware of the effect it would produce, nothing can be a greater proof of their disinterestedness; for it would at once annihilate their trade. Every man, as soon as he was taken ill, would know the disease and the remedy; he would send to the chymist's shop, instead of sending to the doctor;

doctor ; physicians would be mere drugs, and the only drugs that would be quit useless, and the world would not only get rid of diseases, but of what, in the opinion of some people, is very near as great a grievance.

But unfortunately diseases are very numerous, and specifics very few ; perhaps the whole catalogue of those which act with any degree of certainty, is exhausted in the two above mentioned ; whereas the powers of other medicines are far inferior and much less certain, and the propriety of administering them often extremely doubtful ; for although some diseases manifest themselves so plainly that the most ignorant cannot mistake them, yet others appear in such a questionable shape, that the most knowing are puzzled to decide to what class they belong, and the combined powers of experience and sagacity have sufficient employment in treating them.

A young man happened to be present at the trial of some causes of no kind of intricacy, where the proof was full, and where law as well as equity lay clearly on one side. The judge of course decided without hesitation, as any man of common sense and honesty would have done. "Of all professions," said the young man to the judge, "certainly yours is the easiest; any body who has eyes may be a judge ; " all that is necessary is to distinguish black from "white." "But that is a very difficult matter," replied the judge, "when the cause is grey."

In medicine, as well as in law, there are many cases of a grey complexion, in which it requires all the experience of the clearest-sighted to determine whether the black or the white predominates. Till this important point is justly decided, neither reasoning nor experience can assist us in treating the disease : Although repeated experience in rheumatic and scorbutic cases, for example, should have convinced a practitioner

practitioner of the efficacy of a particular treatment, if he happens to mistake the pains and blotches which originate from a venereal source for rheumatic or scorbutic, his treatment will not avail.

But to resume the comparison; what renders the situation of the physician more distressing than that of a judge is, that it is only in doubtful cases that the latter is at a loss; for when the case is quite clear, he has a relief for the white, and a proper remedy for the black in his power: Whereas even in some of those cases which admit of no manner of doubt, and where the disease is perfectly ascertained, the physician knows of no cure. I do not say he knows of no prescription; those he will find in some of the practical books in as great abundance for incurable as for curable diseases.

I remember having been shewn a manuscript copy of a New Practice of Physic, wherein the first article that catched my eye was that on the scrophulous temper, towards the end of which I perceived the word CURE in capital letters, followed by a number of recipes, which I immediately perused with the greatest eagerness, and then asked the author if he had known many instances of cures performed by those prescriptions. "I never knew one in my life," replied he; "but of what service would it be to describe a disease, if after the description I did not add the cure?"

I do not intend to imitate this gentleman on the present occasion, being determined to recommend nothing but what I know to be useful, and where I know nothing of that nature, fairly to own it; and although candour will oblige us often to make this humiliating avowal, perhaps it will appear surprizing that we are not forced to make it oftener, when we consider the nature of the human frame, and compare what we know with what we do not know, of some of the principal animal functions.

II.

OF DIGESTION.

PREVIOUSLY therefore to any history of particular diseases, or any practical observations respecting their cure, I shall, in the clearest manner I can, consistent with the brevity of my plan, describe the different processes of nature in support of some parts of the animal œconomy most essential to life; for as health depends upon their being performed with freedom and ease, whatever impedes or disturbs those vital functions, becomes the cause of disease.

One of the most important operations of nature, for the maintenance of animal life, is the digestion of food; from some impediment or disturbance of this process, a very great number of diseases and complaints of various kinds certainly originate. It may therefore not be improper to consider it in the first place.

Organs of digestion of some kind or other are common to all animals with whom we are yet acquainted; but besides these, there are in the structure of most animals, particularly in the human, two systems of mechanism equally essential to life, and mutually assistant to each other, yet distinct in their functions, and different in the principles upon which they act.

These two systems are called the *vascular* and the *nervous*. By means of the first, which is the most comprehensive, four very important functions are performed. I shall mention them in the order in which they are afterwards to be considered:

1. The circulation of the blood.
2. The secretion or separation of certain fluids from the blood.
3. The absorption by the lacteals and lymphatics.
4. Respiration by the air vessels of the lungs.

The second system of mechanism above alluded to, is the nervous; it is entirely composed of the brain and the nerves.—This system, though apparently less complex, is in reality more difficult to be understood than the vascular. We can examine the structure of the brain and nerves, it is true, and have the strongest proofs that they are the immediate organs of perception, sensation, and motion; but in what manner those offices are performed we have not the least conception.

The order in which we propose to make this abridged view of those animal functions may be thought improper: It may be imagined that it would be more natural to begin with the circulation, and the secreted fluids which assist digestion, because there can be no digestion, till the blood circulates. But as the animal economy consists of a circular chain of links, in which it is difficult to distinguish the first, a similar objection might be made at whatever link we began. Were we to begin with the circulation, it might with equal justice be said, it would have been better to have given some idea of digestion, secretion, and absorption, in the first place; because the blood is formed and supplied with juices from the aliment, and no fluids can be secreted from it, till by the process of digestion it has been enriched with those fluids.

Upon the whole, therefore, it may be as well to consider digestion in the first place, and then proceed to the other functions in the order above proposed: If I fail in perspicuity, observing this arrangement, I should equally fail in any other.

Preparatory for digestion, the solid food received into the mouth is divided into small parts by the teeth, and blended with the saliva, a liquor separated from the arterial blood to assist digestion. The saliva is necessary in some degree at all times, for the purpose of moistening the mouth and throat, but in far greater quantity at meals, when it is required to be mixed with our aliment; on this account nature has taken care that the taste, smell, and even the sight of victuals instantly excite a proper secretion of saliva.

The food thus divided, and by the mixture of saliva, air, and the mucus of the mouth and throat, blended into a pulp, is swallowed, and descends into the stomach, where it mingles with a fluid of a more active nature than any of the former, called the gastric juice.

Very different opinions have prevailed in all ages, respecting the manner in which digestion is performed in the human stomach. Celsus informs us this was a matter of controversy among the earliest physicians, some asserting it was by *attrition*,—others by *putrefaction*; others thought that heat was the principal agent in digestion, by which the food was first, what they called, concocted, and then digested. A fourth class, despising the opinions of the former three, declared, that no such things as attrition, putrefaction, or concoction, took place in the stomach; but the food, undergoing no other change than by chewing, was distributed all over the body*.

Similar controversies upon the same subject have subsisted among the moderns; many have imagined that a kind of fermentation takes place in the stomach for the purpose of digestion. About the end of the last century, or beginning of the present, the

* Vide CELSUS, lib.i.

the ancient doctrine of attrition was revived, and acquired new force from the character and calculations of the celebrated Pitcairn; he computed the muscular force of the stomach alone, to be equal to a weight of above 100,000 pounds; and when the force of the diaphragm and abdominal muscles is included, to a pressure of about 250,000 pounds weight.

But none of the powers supposed by physicians, ancient or modern, to be the agents of digestion, were considered by Boerhaave as sufficient for the purpose, if taken singly; he thought the energy of the whole indispensably necessary, and that digestion was effected by their united powers, in the following manner:

The food divided, blended, and swallowed, as has been described, mixes in the stomach with the gastric fluid and the liquors we drink, is there macerated and in some degree dissolved; the solution is farther promoted by the natural heat and closeness of the place, by the action of the muscular coat of the stomach, by the compression of the diaphragm and abdominal muscles, by the pulsation of the aorta and adjacent arteries, by the air received with the food expanding and bursting the cells in which it is included. The solution is still farther assisted by the remains of food in the stomach, supposed to act as a ferment upon the heterogeneous mass of fresh aliment; and the whole is completed by some degree of putrefaction, which he imagines takes place in the animal part of the food.—This account of digestion, with little variation, is adopted by Haller, and has prevailed pretty generally in the medical schools of Europe.

The notion that digestion in the human stomach is performed by a kind of trituration, certainly arose from what is observed to take place in the gizzards

of granivorous fowls. Indeed, if the analogy were exact, there would be no need of heat, fermentation, putrefaction, or any other assistant.

The experiments lately made by the Abbé Spallanzani, Professor of Natural History at Pavia, prove that the stomachs of those animals require no such auxiliaries; and are able of themselves to accomplish feats, hitherto considered as superior to the power, and even inconsistent with the nature of any stomach whatever. He found that the stomachs of pigeons, turkies, and other fowls, can pulverize pieces of glass; abrade and smooth the rugged edges of the hardest substances, even of granite, and for the most part without any injury to the animal. He mentions two experiments in particular, which a person of less ardour for this kind of investigation, and more tenderness for the animal creation, would not have made. He caused a leaden ball to be formed with needles fixed in its sides, the points outwards, and forced it down the throat of a turkey. He contrived to make another swallow a ball of a still more formidable construction; for it was armed with little lancets, sharp at the points and edges, instead of needles: Both balls were covered with paper, to prevent the throat of the animal from being hurt as they descended, but fixed so loosely as to fall off in the stomach. The consequence was very different from what might naturally have been expected; the needles and lancets were broken to pieces, and voided without wounding the animal.

As there is always a considerable quantity of little stones found in the stomachs of granivorous animals, most naturalists are of opinion that the birds are instinctively prompted to swallow them to assist digestion. The Abbé Spallanzani's experiments however tend to prove, and he himself is convinced, that in those animals digestion can be entirely performed by the strength

strength and action of their muscular stomachs, without requiring the assistance of those little stones, which he thinks the birds pick up from mistake and stupidity, not instinct.

But whatever is the power of digestion in those animals, there is little analogy between their muscular stomachs and those of men, than which nothing can be less calculated for breaking or grinding hard substances. Had the human stomach seemed better formed for such purposes; and had its triturating powers been calculated at even an higher rate by mathematicians, still it would have been evident that it performed no such functions; for currants and even ripe grapes, which burst on a slight pressure, when swallowed entire, are often voided unbroken. This observation, made by men of no vast extent of genius or algebraical knowledge, and which in itself is not of the most refined nature, at once overturns the theory of trituration, with all the calculations which supported it, and shews to what a height of error men of the greatest learning and acuteness may build, when they *found* upon a false hypothesis.

Were it possible after this to harbour any doubts on the subject, they would be dispelled by the experiments made at Edinburgh by Dr. Stevens, and published in that gentleman's inaugural discourse, and by other experiments made by the Abbé Spallanzani.—The purport of those experiments was to ascertain whether the gastric liquor acts as a menstruum for dissolving the food, and is the chief agent of digestion. Dr. Stevens prevailed on a person who had the faculty, and had been in the habit of swallowing pebbles, and bringing them up at will, to swallow little hollow spheres of silver, filled with food of different kinds; the sides of those spheres being perforated in various places, the gastric juice had access to, and of course could act upon their contents.

When those balls were brought up, or voided downwards, the food within them was found dissolved either partially or entirely, according to the nature of the food, and the time the balls were allowed to remain in the stomach.

Similar experiments to those which Dr. Stevens had made by the means of the above mentioned pebble-swallowing, the indefatigable and enterprizing Abbé made on himself. He tried many different kinds of food;—he inclosed the balls in little bags of linen, which allowed the gastric fluid to pass through their perforated sides, but prevented all fœculent matter from entering during their passage along the convoluted pipe of the intestines. When the balls were voided, those which contained food of easy digestion had their contents quite dissolved, but some part of the food of difficult digestion remained undissolved. Food put into the balls *well masticated*, was found quite dissolved, when voided nineteen hours after being swallowed: The same food put into the balls *unchewed*, and voided in the same time, was found not so perfectly dissolved. This demonstrates, in the most convincing manner, the utility of carefully chewing the viands for the purpose of facilitating their digestion; and the whole of those experiments tend to prove, that no such thing as trituration takes place in the stomach of man, or of animals whose stomachs are constructed like the human; and of course the alternate pressure* of the diaphragm and the muscles of the abdomen, which was supposed to assist the triturating power, will be considered as of little importance in digestion.

Those experiments with the hollow balls, although decisive against trituration in the human stomach, prove nothing inconsistent with the notion of a certain degree

* In inspiration the stomach is pressed downwards by the diaphragm, and in expiration it is pressed upwards by the abdominal muscles.

degree of fermentation being requisite for digestion; and this is still the opinion, I understand, of some physicians of reputation.

It seems difficult however to imagine, that any fermentation in the victuals can take place in the stomach, without our being constantly put in mind of it in the most disagreeable manner; yet it is only when people are in ill health, and digestion weakened and disturbed by disease, that any feeling or effect that can be imputed to fermentation is perceived. In good health, and while we avoid excess and improper food, the process of digestion is quietly carried on, without our attention being called to it by any disagreeable sensation whatever.

There are three kinds of fermentation described by chymists,—the vinous, the acetous and the putrid. Vomitings of a vinous smell, which sometimes occur even when no wine has been drunk, and the frequent acid eructations with which some people are troubled, are brought as proofs, that the two first kinds of fermentation exist in the stomach, and are necessary for digestion.

Animal substances, however, in no circumstance, not even in a state of putrefaction, undergo the acetous or vinous fermentation; when sour eructations or spitting therefore happen after eating meat, they cannot be imputed to the meat: This with what was formerly remarked, that no such disagreeable circumstance attended people in good health, when the digestion is in its natural state, renders it most probable that those symptoms proceed from some secretion in the stomach itself, and which only takes place when it is disordered, and not from any fermentation in the food requisite for its digestion.

The notion that some degree of putrefaction is necessary to complete digestion; and that it actually takes place in the animal part of our food be-

fore it leaves the stomach, has been combated by various arguments. It has been observed that the saliva of those who have fasted for a long time is in some degree acrimonious ; so are their other juices ; and even their breath, though naturally sweet, is then offensive ; but soon after eating, the acrimony and offensiveness disappear.

When a nurse passes too long a time without fresh supplies of viuals, her milk becomes rank and bitter, and the child she suckles rejects it with disgust. Let her take a basin of fresh broth, and within a short time her breasts will be filled with sweet milk, and the child will suck with avidity.

From these facts it is argued that no degree of putrefaction can take place in any part of the food in the process of digestion, because digestion is in reality the conversion of the food into chyle, and if putrescence was necessary for that, it would, of course, by means of the chyle, be communicated to all the juices of the body ; and the breath, saliva, and milk, instead of being sweetened, would be rendered more offensive in consequence of eating.

The circumstances of the bitter alcalescent taste of the saliva, the offensiveness of the breath, and salt disagreeable taste of the milk of nurses after long fasting, are certainly true ; and it is equally true that those qualities are changed and sweetened in consequence of eating ; but that this happens by the means of the food being converted into chyle, and *that* chyle being mixed with the blood, and diluting and moderating its acrimony, and of course sweetening the juices secreted from it, is not very probable ; for it must take several hours after eating, before a sufficient quantity of chyle can be separated from the food and mixed with the blood, during all which time the saliva and milk should be growing more

more and more offensive, because they are secreted from the old blood not yet diluted with fresh chyle; whereas in reality the change is made in the saliva and breath almost instantaneously, and in the milk, in less than an hour. The saliva, breath and milk, becoming so soon sweet, must therefore proceed from other causes, and proves nothing either for or against putrefaction being necessary for the digestion of our food.

But although it does not apply in these particular instances, the following seems a fair presumptive argument.

Food undergoes nothing akin to putrefaction in the process of digestion, because it supplies the blood with fresh juices; and if it underwent putrefaction, the addition of chyle, instead of diluting and cooling, would naturally render the blood more acrimonious and putrescent.

But the industry of the Abbé Spallanzani, and of an eminent anatomist and surgeon of this country, has not left the matter to presumptive arguments. They have proved by irresistible experiments, that animal food, so far from acquiring a putrescent quality in the stomach, if it happens to be tainted when swallowed, becomes sweet and perfectly free from all taint before it is digested: From which we may naturally conclude, that the fluid constantly existing in the stomach, called the gastric juice, is endowed with an antiseptic * quality.

The idea formerly taken notice of, that a fermentation is always raised by some remains of the former meal, seems groundless, from this circumstance, that digestion is carried on quicker when food is received into an empty stomach, than when it is mixed with the remains of any former meal.

In

* What resists putrefaction.

In answer to this and other arguments urged against the notion of fermentation, those who support that opinion assert, that the digestive fermentation, which, according to them, takes place in the human stomach, is of a peculiar kind, unlike either the vinous, acetous, or putrefactive, and not to be judged of by any analogy with them.

This is one way, to be sure, of getting rid of many objections; but when one thing is so unlike another as to have no resemblance to it at all, I own I am extremely apt to conclude that it is quite a different thing; and if I were permitted, I should choose to call it by a different name.

Upon the whole, it seems probable, that the gastric fluid corrects any tendency to putrefaction that may be in some parts of the aliment; and without exciting any evident fermentation, is one of the most powerful agents of digestion; the process being completed by two fluids which mingle with the aliment soon after its expulsion from the stomach, as shall be more particularly mentioned hereafter.

It is said that the gastric juice has been found to retain this dissolving power out of the stomach; but it being an exceedingly difficult and painful matter to procure this fluid, a sufficient number of experiments have not yet been made to ascertain this point.

An obvious and apparently strong objection, however, presents itself to the opinion, that the gastric fluid is a menstruum. If the gastric fluid has the power of dissolving the food, how does the stomach itself, which is of the same nature with some parts of our food, remain undissolved?

Those who support the doctrine, endeavour to remove this objection, by asserting that the mucus which sheathes the internal coat of the stomach is sufficient to prevent that effect; or if that is denied, they

they content themselves with saying, it is prevented by some peculiarity in the structure of the stomach, which we cannot investigate.

Mr. John Hunter, the anatomist above alluded to, with more ingenuity, supposes that the same living principle which resists the putrescent tendency of the blood and other juices, prevents the stomach itself from being affected by the gastric fluid, while it penetrates and dissolves the aliment. In confirmation of which, he observes that worms can remain a considerable time unhurt in the stomach, while they retain the principle of life; but as soon as they lose this and die, they are dissolved and digested like other substances. In like manner he asserts, that while the stomach itself retains this living principle, the gastric fluid cannot affect it; but when the person dies, that fluid immediately begins to corrode it, and sometimes is found to have made its way entirely through the coats of the stomach into the cavity of the abdomen.

There are so many instances, in the annals of medicine, of men of the greatest abilities supporting theoretical opinions which have afterwards been found erroneous, that every new notion, no doubt, ought to be examined with the greatest accuracy before it is fully admitted. The opinion in question, however, must be allowed to be highly ingenious, and has the advantage of an advocate able to do it all justice; so that if it falls, it must be from its own fault, and not his.

After the stomach has retained the food a due time for performing its functions (by whatever means they are performed) and after it has perfectly commingled the various mashes, and rendered it more homogeneous* to the circulating blood, the whole

is

* Of the same nature,

is squeezed through a narrow passage called the pylorus, into the first of the intestines.

The stomach being shaped somewhat like a bag-pipe, this passage, as well as that by which the food enters the stomach, is higher than its bottom : In its way to the pylorus, therefore, the food must proceed contrary to its gravity, which indeed it must frequently do afterwards in passing along the various convolutions of the intestinal canal.

To enable the stomach and intestines to perform this, they are endowed with a vermicular or peristaltic movement, by which the food is gradually propelled, and the excrement voided.

As soon as the alimentary mash has left the stomach and entered the first of the intestines, it meets with the pancreatic juice, and the bile ; the first separated from the blood by a glandular substance called pancreas, and the other by the liver, and both poured through the respective ducts of those organs into the intestine nearly at the same place.

The substance of the pancreas has great analogy with that of the salivary glands, and its juice with the saliva ; the former, however, if we may judge from the comparative size of the pancreas and those glands, must be secreted in far greater quantity. The chief use of the pancreatic juice, according to some physiologists, is to dilute the bile, and render that viscid fluid, which is more acrimonious than any other of the animal juices, more mild and more miscible with the food.

But to make one juice imperfect and incapable of performing its functions till it is mixed with another, is very unlike the usual precision and simplicity of nature. It seems to me, therefore, more probable, that the pancreatic juice and the bile have distinct offices, but both tending to the thorough digestion of the aliment.

The bile is a penetrating liquor of the nature of soap, capable of dissolving gums, resinous substances, and rendering oily fluids miscible with water ; this saponaceous fluid, therefore, is of the greatest use, by mingling with the aliment as it comes from the stomach, completing the process begun there, by a more perfect dissolution of the oily viscid parts, and giving the various substances of which our food consists one common appearance and nature, from which an uniform fluid, resembling emulsion, and called chyle, is sucked by the lacteal vessels, and thrown by the thoracic duct into the circulating blood, of which it is immediately to become part.

The stimulating quality of the bile is likewise supposed to be of service by exciting the peristaltic motion of the intestines, and protruding the coarse parts of the food through the intestinal canal, till they are thrown out of the body in the form of fæces.

The whole account of digestion may be thus abridged.—The food being previously divided and blended with saliva and air by mastication, is swallowed, and meets in the stomach with the gastric juice, whose dissolving power, assisted by the natural heat of the place, is the principal agent of digestion.

The process is completed by the pancreatic juice and bile, the nutritious parts of the food being by this process converted into chyle for the support of the body, and the grosser parts thrown out.

III.

THE CIRCULATION OF THE BLOOD.

THE next important function of the animal œconomy, and the first belonging to the vascular system we proposed to consider, is the Circulation of the Blood.

The heart being the center and most active instrument of the blood's circulation, must be considered as one of the most important, perhaps the most important part of the body: It is one of the few parts of the body in which a wound is certain death.

Nature has taken care to place those organs, upon which life more immediately depends; in the strongest situations, and where they are best defended from external injuries. Thus the brain is protected by the bones of the skull; and the heart and lungs are also lodged in a bony fortification composed of the ribs and vertebrae.

The heart is probably the first part that is formed: In examining the incubated egg, the first thing that can be perceived is a small red point; and the first movement is a motion like a pulsation of that point, which turns out afterwards to be the left ventricle of the heart; the other parts seem to be all gradually formed from this.

Observations of this nature cannot be made on the human body; but from analogy we suppose that the same circumstances take place in the human embryo *. The heart has a greater share than

any

* The child unfinished in the womb.

any other part, of that sympathy which has been observed to exist in the various parts of the body; and which will be mentioned more particularly hereafter.

No organ of the constitution can be severely affected, without affecting the heart, and disturbing its functions; nor can the heart be *in the smallest degree* affected, without disturbing every function of the animal œconomy.

But the heart is not only affected by what injures the body, but also by whatever ruffles the mind. Rage occasions frequent and forcible contractions; sorrow, slow and languid ones: And there are instances of violent passions suspending the contractions of the heart altogether, and occasioning death. The heart is not only affected by what hurts the body or mind of the person to whom it belongs, but also by what hurts the bodies or minds of others. But the extent of this kind of sympathy, differs greatly in different persons. In some it embraces children, friends, relations, countrymen, and, in a certain degree, the whole human race; in others, it seems to be entirely confined within the limits of their own bodies, or at most reaches with a blunted sensibility no farther than to those whom they conceive to be their own offspring.

The human heart is a muscular substance, of a conical form, situated within the chest, with its apex or point inclined downwards, and to the left side. It is divided by a fleshy partition into two cavities, called ventricles. At the basis of the heart, on each side are placed two little appendixes, called auricles, which receive the blood from the veins before it enters into the ventricles, and the circulation is carried on as follows:

Through the left auricle of the heart the blood enters the left ventricle, which contracting, propels

it into the large artery, and from thence into the branches, which becoming smaller and smaller as they spread in infinite ramifications, diffuse heat and nourishment all over the body. Those ramifications terminate in the smallest order of blood-vessels, called capillaries; they pour the blood into the smallest order of veins, which growing gradually larger as they approach the heart, slowly carry back the blood (after the bile, urine, spittle, and other juices, have been sucked from it, and after the remainder has been reinforced by the accession of the chyle) and pour it into the right auricle, from whence it flows into the right ventricle;—but before it is allowed to renew its course through the body, it is forced, by the contraction of that ventricle, into the pulmonary artery, which immediately splitting into innumerable branches, spreads over the air-cells of the lungs.—Those cells are the terminations of the branches of the wind-pipe, which receive the air in respiration; and being equally ramified with the blood-vessels, run in contact with them, and form the substance of the lungs.

The capillary vessels of the pulmonary artery become the origins of the pulmonary veins, through whose gradually enlarging branches, the blood, after undergoing those various changes, is carried back again to the left auricle of the heart, from whence it began its course; which course, the moment it is finished, must be recommenced as long as life continues. Whatever obstructs, disturbs, or renders this circulation irregular in any degree, creates disease.

The lungs then are a congeries or mass of air-vessels, air-cells, arteries, and veins, so admirably arranged as to perform their distinct functions without confusion, and yet so intimately blended, that no single point could be pierced with the finest needle,

idle, without piercing all those different kinds of vessels.

The singular structure of the lungs, the unexpected course which the whole mass of blood, after having finished its circuit through the body, is obliged to make through this single organ, plainly demonstrates that some very important purpose is served by such an uncommon arrangement, and such expence of mechanism. As the chyle joins the blood a little before it is thrown into the pulmonary artery, it is imagined, that this second circulation through the lungs is absolutely necessary to complete sanguification, in other words, perfectly to change the properties of the chyle, and mix and blend it with the blood so as to form them into one uniform fluid fit for secretion, and the other purposes of the animal œconomy.

But without farther enquiry into the use of this particular circulation, as it will in some measure be resumed when we come to treat of respiration; we need only observe at present that there are so many proofs of Nature's accomplishing the most important purposes, by the most simple and best adapted means, that we may rest satisfied she has not deviated from her general rule on this occasion.

The valves * so peculiarly adapted to the entrance of the different ventricles, and to the mouths of the arteries, and which allow the blood to rush freely into the ventricles and arteries, but prevent it from regurgitating

* Those valves are little thin membranes contrived to prevent a reflux of blood when the heart contracts. They are of two kinds; those that terminate the auricles and give a free entrance to the blood from them to the ventricles, but effectually hindering it from being thrust back by the same way; and those of the great arteries, admitting the blood freely from the heart into them, but preventing it from regurgitating into the heart on the contraction of the arteries.

regurgitating on their contraction; and indeed, the whole wonderful mechanism by which torrents of blood arriving from different parts of the body, and meeting at so small a point as the human heart, are prevented from shocking with each other, and disturbing the uniform and continued process of circulation, are not more worthy of admiration from the importance of the ends, than for the simplicity of the means used to accomplish them.

The motion of the blood through the arteries does not entirely depend on the contracting force of the heart; they have a strong muscular coat of their own, which after distension enables them to contract and assist the power of the heart. Before death they are so much contracted as to thrust all the blood into the veins.

The heart of man, and of all that are called the more perfect animals, are constructed with two ventricles and two auricles, and all of them have a double circulation, one through the body and the other through the lungs, as has been described.

But there are animals whose hearts have two auricles and only one ventricle; in them the circulation is carried on in this manner;—the blood being brought by the pulmonary veins to the left auricle, and by the vena cavae into the right, flows from both into the ventricle, and on its contraction, part is thrown into the pulmonary artery, and the rest into the aorta, which carry it to the lungs and all over the body, from whence it is brought back by the veins to the auricles. This kind of circulation takes place in the turtle.

There are other animals, particularly cod and all flat fish, whose hearts have only one auricle and one ventricle; in these, when the heart contracts, the blood is thrown into an artery which carries it to the gills, which in fish serve the purposes of lungs;

lungs ; from these it returns by the veins, which uniting, throw it into the aorta, by which it is dispersed over the body; and afterwards being brought back it is thrown by the venæ cavae into the auricle, and flows from it into the ventricle.

We are told that the heart of one animal is still of a simpler construction, consisting of only one ventricle and no auricle. This animal, which is a species of worm called *eruca*, has no veins, but an artery issuing from the heart, and which afterwards branches all over the body ; here the blood, instead of circulating, is said to flow forward and backward responsive to the contraction and dilatation of this reptile's heart. This distinction of hearts was first made by that diligent and accurate anatomist Mr. John Hueter.

Our knowledge of the blood's circulation has perhaps not made so great a change in the practice of medicine as might have been expected ; but as it has overturned all the false theory that was founded upon the supposition that the blood moved in another manner ; and prevents any new theory from being admitted that is inconsistent with the established truth of circulation ; of course all the erroneous practice that was or might be formed on such false theories can no longer take place. In the practice of surgery, by far the most certain part of the healing art, the improvements derived from this discovery are great and manifest.

By the use of the tourniquet alone many operations are rendered safer than they were formerly, and many lives preserved by this and other improvements made upon the same principle, which has been peculiarly advantageous to those brave citizens whose lives and limbs are so often exposed to the accidents of war.

The circulation of the blood was first demonstrated by Dr. Harvey, about the beginning of the last century ; a discovery which has rendered his name immortal, and reflected lustre on the English nation. Envy could not quietly bear that so much honour should fall to the share of any individual. That she might have the pleasure of tearing them from the brows of Harvey, she was willing to adorn the busts of the ancients with his laurels. The first attack that Harvey's enemies made upon his fame, was by asserting that the circulation of the blood was known to the ancients. But if the ancients knew it, how came those learned gentlemen who tell us so, to have been ignorant of it ? Finding that this attack did not succeed, it was next insinuated that Harvey's more immediate predecessors had cleared the road, and pointed it out so clearly that he could not miss it.

But all attempts to diminish the merit of this discovery, by enumerating what was known in anatomy before his time, and by enhancing the advances made by Vesalius, Servetus, and others, are equally vain and invidious. They had done so much, it is said, that they had left him *little* to do. But why did those great men leave to another that which would have done themselves more honour than all their past labours ?

How infinitely absurd to call that *little*, which those very men whose genius and acuteness are described as *prodigious*, could not accomplish, and which escaped the penetration of all the anatomists, physicians and philosophers, that the world produced, till Harvey made the happy discovery—a discovery not made, as many useful arts have been discovered, by accident, but in consequence of deep reflection and careful investigation; by weighing and comparing facts,

facts, drawing inferences from the discoveries of others, which their authors were unable to do, and advancing step by step to that important demonstration which has justly acquired so much honour to the discoverer himself, and has added dignity to the name of an Englishman.

IV.

OF THE SECRETION OR SEPARATION
OF PARTICULAR FLUIDS FROM THE
BLOOD.

BEFORE we attempt to give any idea of secretion in general, or of secreted fluids in particular, it is proper to say something of the blood itself, from which they are all derived.

While blood is in circulation, and for some time after it has flowed out of the body, it seems an homogeneous red liquor, somewhat thicker than water.— While it remains warm, it is constantly throwing off a watery vapour. After having been a certain time out of the body, whether in a cold or warm air, it thickens into a gelatinous mass, which soon separates into two parts; one solid, called crassamentum, the other liquid, called serum.

The crassamentum consists of a fluid which coagulates spontaneously, and on that account has been distinguished by the name of coagulable lymph, and of another substance which gives the red colour to the blood. The coagulable lymph may in every state of health be separated from the rest of the blood by art. In certain diseases it separates naturally.

The buff-coloured coat which appears on the surface of blood in rheumatisms, pleurisies, and other inflammatory diseases, is no new substance formed, as was supposed*, by these distempers, but merely the

* This was clearly proved by the late very ingenious Mr. Hewson.—Vide his Experimental Enquiries into the Properties of the Blood.

the coagulable lymph deprived of the red part of the crassamentum.

In those diseases the blood suffers a change which hinders the lymph from coagulating so soon as it does in health; when received into a basin, therefore, and suffered to rest, the red particles, being the heavier, gravitate to the bottom before the lymph congeals, and leave it like a buff-coloured jelly on the surface; whereas in health the coagulation takes place so soon after the blood is taken out of the body, that the red part is entangled and prevented from separating, and of course the crassamentum retains the natural colour of blood. From hence we may see the reason why this inflammatory crust, as it is called, is thickest when the disease is most violent, wears gradually thinner as the disease abates, and at last entirely disappears with the complaint. It accounts also for this crust not appearing on the surface of inflamed blood, if it is stirred and kept in motion till it congeals.

The serum is a fluid of a yellowish colour, thicker and a little heavier than water. It consists of a kind of mucilaginous substance dissolved in water, which contains also some neutral salt.

The mucilage above mentioned; although it does not coagulate spontaneously on being exposed to the air, like the lymph of the blood, yet it does coagulate with a certain degree of heat, like the white of an egg.

Acids and alkohol have the same effect; but we can hardly suppose they ever can be received into the circulation in sufficient quantity to have this effect there; if they should, it is evident, that by putting a stop to the circulation, they must occasion immediate death.

The air is a strong coagulant of the blood, producing that effect in a few minutes, which does not take place, from mere rest in the veins, for several hours.

It is also remarked by Mr. Hewson, that it coagulates at different periods in different constitutions, and in different diseases.

The same gentleman asserts, that the disposition of the blood to coagulate increases in proportion as the animal is weak ; from which he draws this practical inference, that it is improper to rouse a patient fainting from hemorrhage by stimulating medicines, because the languor or faintness favours the contraction of the divided arteries and the coagulation of the blood at their bleeding orifices, and thus tends to stop the hemorrhage. In this manner blood-letting is often expedient in hemorrhages ; for when they are not profuse, but long continued, the disposition of the blood to coagulate, and of the vessels to contract, may not be sufficient ; but when the vessels are emptied suddenly by blood-letting, both effects may be produced, and the hemorrhage stopped with the loss of less blood than if venesection had not been used.

To the disposition to coagulate in the body by rest alone, may be imputed the coagulation found sometimes in the disease called aneurism*, also that in part of the large arteries after amputation, and those called polypi found in the heart and the large vessels near it. The last indeed are generally supposed not to take place till after death.

Blood distilled in a glass retort yields water, volatile spirit like spirit of hartshorn, inflammable oil, and ashes which no force of calcination can consume, but which, by pouring water on them, yield a small quantity of fixed salt and some earth, amongst which are found particles supposed to be of the nature of iron, as they are attracted by the loadstone. The red colour of the blood is thought by some to be owing to this ferruginous matter ; which opinion they

imagine

* Vide Mr. Hewson's Experimental Enquiries.

imagine is strengthened by its being observed that blood becomes of a more florid colour after a course of steel medicines.

This notion, however, seems to be too hastily formed, for the ferruginous matter is in very small quantity, no solution of iron out of the body is of a red colour, and as to the blood becoming more florid after a course of steel, it most probably has this effect merely as a tonic, for it is certain that the blood is florid in proportion to the strength of the constitution.

The crassamentum and serum are in different proportions in different habits.

In the laborious, active and strong, the crassamentum is in greater proportion to the serum than in the weak and languid.

The serum contains a greater proportion of water and salt than the crassamentum, the latter more oil; of course when dried it is inflammable.

The proportions of the constituent parts of the blood must also in some measure depend on the diet.

That the diet influences the health, nobody will call in question, but some have fancied that it also has a very considerable influence on the character and disposition.

Those who entertain this opinion, think that a large proportion of alkalescent* salts in the blood tend to produce a choleric and fierce turn of mind. In proof of which they observe, that birds and beasts of prey who live constantly on animal food, which contains a large proportion of those salts, are more fierce than other animals.

This, however, probably depends on other causes; for if animal food alone, even when taken in astonishingly

* Any substance which effervesces when mixed with an acid is an alkali.—What has a tendency to this is alkalescent.

tonishingly great quantities, could produce this effect, many peaceable citizens and worthy aldermen, instead of being the quiet worshipful creatures they are, would be the fiercest and most outrageous animals in the world.

When the blood is examined with a microscope, it appears not an homogeneous fluid, but seems to consist of red globules swimming in a clear liquor.

There have been different opinions respecting the exact shape of those globules; some observers asserting they are of a spherical, others of a lenticular* form. When a dispute commences, men are unwilling to yield, whether the point in question regards their microscopes or their senses. The controversy was, as usual, carried on with great warmth.

While the curious were straining their eyes to ascertain this important matter, a great philosopher pronounced that both sides were in the wrong, for the globules in dispute were neither spherical nor lenticular, but that each consisted of six small globules adhering together in the form of a mulberry; and that notwithstanding their appearing of a red colour while adhering, yet each of the six small globules, when separate, were not red, but yellowish or transparent.

The last part of the assertion could not well be denied; for although the microscope has been carried to a greater degree of perfection since this philosopher wrote, nobody has been able to perceive this union of the six globules; and it is not fair to dispute the colour of an object till a sight of it can be obtained.

This therefore became a matter of faith rather than of demonstration; and that believers might have

free

* Of the form of a lens, that is, a round figure, convex on both sides, but flatter than a sphere.

free scope for the exercise of this virtue, they were farther informed from the same authority, that the second order of globules were no more than the first of an uniform spherical surface, but that each of them was composed of six globules of a third order, adhering in the same manner; and over and above, that it was philosophical to believe it, that the subordination does not stop here, but that there is a fourth, a fifth, and Heaven knows how many more orders of globules, all in the same style with the first, with an equal subordination of vessels adapted for their reception; which beautiful arrangement will become manifest as soon as our microscopes are sufficiently improved to bring it within the sphere of our vision. There can be no great harm, however, in suspending our absolute belief till this improvement takes place.

While the blood is in circulation, various liquors are separated from it by a process called Secretion, all these secretions being necessary for the health and preservation of animal life.

1. The semen is secreted for the purpose of generation.
2. The *liquor amnii*, or fluid in which the foetus swims, contributes to its safety and preservation in the womb, and facilitates its entrance into the world.
3. The milk is secreted in the breasts of women after child-birth for the nourishment of the infant.
4. The *urine* and *sweat*, being excrementitious, are thrown out of the body.
5. The saliva, the gastric juice, bile, and pancreatic fluid, are all subservient to the purpose of digestion.
6. The *liquors* which moisten the cavities of the *thorax** and *abdomen*||, and the interstitial fluid of

* The chest.

|| The belly.

of the *cellular membrane*, are contrived to admit of easy motion among the viscera, and prevent the bad effects of attrition. These are also the purposes of the *liquor* contained within the *pericardium**, and the *watery humour* within the *tunica vaginalis* of the testicles ; without the first the constant motion of the heart would produce a fatal effect, and by means of the second the most delicate organs of the human body are enabled to elude many external injuries to which they would otherwise be liable.

7. The unctuous nature and the bitterness of that yellow substance that is secreted in the ears, protect them from the invasion of all kinds of insects.
8. The mucus which lines the intestines and the urethra, sheaths and defends those canals from the acrimony of the substances which pass through them.
9. The synovia or mucilage which lubricates the joints, is happily placed to allow the heads of the bones to slip smoothly over each other, and render their motion easy.
10. The tears wash injurious substances from the eyes, preserve their transparency ; and although sometimes they are expressive of the weakness of human nature, at others they indicate that sympathy and benevolence which are its most distinguished ornament.

The wisdom displayed in providing those various fluids for the preservation and comfort of animal life, is manifest to the dullest observer ;—the means by which they are provided, puzzle the most acute.

Such investigations are exceedingly natural to that spirit of enquiry, with which, for wise purposes, the mind

* The membranous bag which loosely surrounds the heart.

mind of man is endowed; and those physiologists who have attempted to explain this and other parts of the animal œconomy, deserve praise for their good intentions, as well as their ingenuity, although they may have often failed in conveying that conviction to the minds of others, which long thought on favourite subjects, and the ambition of discovery, seem to have produced in their own.

I shall adjoin however a short view of what is given by some of the most celebrated physiologists, as an explanation of the manner in which the animal secretions are performed.

The blood, we are reminded, is a mixed liquor, consisting of red globules and various fluids of different densities in which they swim. These globules are the largest of all the particles which constitute the blood. The diameter of the smallest artery which circulates blood, must therefore be larger than that of a red globule; but vessels or canals whose diameters are smaller than red globules, arise from those arteries; into them, it is evident, no red globule, without unnatural force and stretching, can possibly enter: But the fluids whose particles are smaller than red globules, may in the course of natural circulation enter this smaller order of vessels. And if from the above mentioned secreting vessels a smaller order of canals arise, whose diameters cannot admit one of a thinner nature, the thinner parts of this fluid may enter this third order of canals. In the same manner a fourth and thinner secretion may by the means of a fourth and a smaller order of vessels be separated from the third, a fifth from a fourth, and so on.

It is evident that none of the secreted fluids can be of a red colour; for if a vessel is large enough to admit the red part of the blood, it would of course admit all the other parts, and the contents of the ves-

sel would not be a fluid secreted from the blood; but the blood itself. It is equally evident by the above account of the matter, that the grosser secretions are made from the sanguineous arteries, and the finer from vessels arising from them, which secretions become finer and finer in proportion to the number of removes the secreting vessels are from the real blood-vessels.

We are assured also by some physiologists, that the red globules have no inclination to deviate into the mouths of the secretory vessels; but on the contrary, that they and the denser particles of the blood in general have a natural propensity to keep the middle of the canal; while the thinner particles recede to the sides, and by that means are more easily caught by the secretory orifices.

But this method of explaining the mystery of secretion by a subordination of vessels drawing off the thinner, and leaving the thicker fluids of which the blood is composed; and thus forming separate liquors of various kinds, does not account for the secretion of those fluids which are thicker than the blood itself: Those fluids therefore must be supposed to have been thinner at the moment of secretion, and afterwards to have become thicker, which may happen either by the *evaporation* of the watery particles, when the secreted fluid is exposed to the air, as is the case with the mucus of the nose* and the wax of the ears; or by the absorption of those watery particles, which is supposed to be performed by the initiating vessels of the ducts and canals, through which the secreted fluid is obliged to make a tedious, inflected, and circuitous course, for the express purpose of giving time for the absorption of the thin particles.

Some

* That the mucus of the nose is thin and watery at the instant of secretion, we know by the effect of sternutatories.

Some of the secreted fluids are deposited in certain receptacles provided for them within the body, where they are kept as in a magazine till there is a demand for them. Thus the bile, after its separation from the blood in the liver, is deposited in the gall-bladder, where it becomes more high-coloured and viscid; and in like manner the semen was supposed to be deposited in the seminal vesicles, ready prepared for the calls of nature; in confirmation of which it was urged, that in the continent it is of a thicker consistence than in men who are of a different temperament.

But this argument has been overturned by later anatomists, who assert, and bring strong proofs in confirmation of the assertion, that the vesiculæ seminales are not a receptacle for semen, but that they secrete a different fluid. This however comes nearly to the same thing, as this fluid is lodged in these vesiculæ ready for the calls of nature and purposes of generation. And in the same manner the milk is kept ready in the large ducts of the mammae.

In attempting to explain what is difficult and absurd, it is not surprizing that every circumstance is laid hold of that can possibly be supposed to assist in making it out; accordingly we are told that the nature of the secreted fluid depends in some measure upon the angle which the secreting duct makes with the trunk from which it branches; and as the vessels are detached at a great diversity of angles, and are ramified in various manners, and as Nature does nothing in vain, the conclusion is drawn, that this variety of angles and ramifications assist in producing the variety of secreted fluids. Men are too apt to mistake their own fancies for the aims of Nature. To allow therefore, that Nature does nothing in vain, and to admit all that is above asserted, are

are very different concessions ; for there may be very good uses answered by distributing the small branches of arteries in different manners to different viscera, although the varying the secreted fluids is not one of them ; besides, it affords but little satisfaction to be persuaded, that the variety of the one really contributed to the variety in the other, if, after all, we cannot form an idea *how* it contributes.

To make this matter a little clearer, and to account in some degree for the different fluids secreted in different parts of the body, it has been asserted that the blood which arrives at the various places of secretion is of a nature and quality similar to the humour *there* to be secreted. Blood, when is first issues from the heart, before any of the secretions have taken place, is supposed to be more watery than afterwards, and on that account, we are told, the emulgent arteries, from which the urine is secreted, are placed near the heart.

The mammary arteries of nurses, it is said, are more plentifully furnished with chyle than any others ; and therefore the milk, a liquor resembling chyle in many particulars, is secreted from them.

The bile, an oily and acrimonious secretion, is secreted from the blood returning *sluggishly* loaded with oil, and contaminated with rancid effuvia from the omentum and other viscera of the lower belly. And to crown the whole, we are assured that the blood carried by the carotid arteries to the brain, is of a more spirituous and refined nature than any of the rest of the mass, for this very sufficient reason, that the animal spirits, which are the most refined of all possible fluids, are secreted there.

All this is fanciful and well arranged, but would be more convincing, if upon examination the blood of the emulgent arteries were really found more full of water than the blood of other arteries, or if the blood

blood of the vena portarum* were not found the same in all respects with blood returning by the veins from all the other parts of the body. Had the blood in the first case been sensibly impregnated with urinous, and that of the second with biliary particles, it might have been natural to have judged *a priori*, that urine would be drawn from the one and bile from the other ; but as previously to the secretions, no such particles can be found, the matter seems rather darker after the explanation than it was before.

As to the assertion concerning the spirituous quality of that portion of blood carried by the carotids to the brain, the argument stands nearly in this way.

The blood sent to the brain is more spirituous and refined than the rest of the mass.

I do no find it so.

Yes, but it must be so.

Why ?

Because the animal spirits are secreted from it, and all the world knows that the animal spirits are the most refined of all fluids.

Where is this fluid ?

In the nerves.

Cut a large nerve, and shew it to me.

You cannot see it, it is so refined.

That is unlucky.

On the contrary, it is the most fortunate thing in the world ; if we could see it, it would be good for nothing, but we are sure it is there.

How so ?

How so ? For what other purpose but the secretion of this fine æthereal fluid would the most spirituous part of the blood be sent by the carotids to the brain ? So that it is clear from this circular demonstration,

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that

* The vessel which carries the blood from the viscera of the lower belly to the liver.

that the most refined part of the blood goes to the brain, because the animal spirits are secreted ; and that the animal spirits are secreted there, because the most refined part of the blood goes to the brain.

The notion that the mammary arteries of nurses are more plentifully stored with chyle than the other arteries of the body, has arisen on no better foundation.

The blood of those arteries has never been actually found impregnated with a greater proportion of chyle than that of others ; but as on perceiving that the urine, a watery liquor, is secreted by the kidneys, and the bile, an oily one, by the liver, it is concluded that the blood which goes directly to those two organs is fuller of *watery* and *bilious* particles than the rest of the mass ; so on finding that milk, a fluid resembling chyle, is secreted in the breasts of nurses, it is taken for granted that the blood of their mammary arteries is uncommonly full of chyle.

It would appear, indeed, that the chyle is a considerable time before it changes its nature, and is assimilated into the mass of blood ; for when blood is drawn after a plentiful meal, the serum is of a whiter colour than usual, owing in all probability to the fresh absorbed chyle's not being perfectly assimilated ; but this regards the mass of blood in general, and not that of the mammary arteries in particular. It is certain, however, that when a nurse is kept too long from food, and her breasts almost entirely drained of milk, what little is found there contains an unusual quantity of salt, and is rejected by the infant with signs of disgust ; yet within three quarters of an hour or an hour after eating a competent quantity of fresh broth, her breasts will be replenished with milk, and the child will suck with satisfaction and avidity. In this case the food received into the stomach, if not the immediate source of the milk, seems at least the cause of the breasts

breasts being filled with that liquor; but the shortness of the interval between the cause and effect seems surprizing, and difficult to be accounted for.

We cannot suppose that this food is digested, converted into chyle, this chyle thrown in the common way into the mass of blood, and secreted in the form of milk from the mammary arteries; for the process of digestion alone must engross much more time than the whole interval in question. But even upon the supposition that the digestion could be completed and the chyle formed from the food within that interval, this would not remove the difficulty. Let us consider the journey the chyle has to make before it arrives at the breasts: It is first carried into the thoracic duct, thence into the subclavian vein to be mingled with the blood; from the subclavian vein it flows into the vena cava, passes through the heart, then through the lungs; returns and passes again through the heart into the aorta, and is distributed all over the body, the common proportion only going to the mammary arteries, from whence the chyle is secreted. When we think on all this, and recollect also that the chyle falls drop by drop into the subclavian vein, and is mingled in this circuitous course with the blood of the whole body, we cannot possibly conceive that the proportion of chyle formed from this single meal, which falls to the share of the mammary arteries, is the entire source of this copious flow of milk. Others suppose that the broth, without waiting the usual process of digestion, is absorbed by the lacteals of the nurse's stomach, and carried directly to the thoracic duct, and so into the blood. But this supposition, even if granted, would only cut off the time taken up in digestion, and leave the other objections in full force.

The fact being certain, and all these methods of accounting for it unsatisfactory, some have suspected that there is a secret conveyance undetected by anatomists, by which this nourishment is smuggled from the nurse's stomach to her breasts, and there converted into milk, without being previously either changed into chyle or blood. But to this wild hypothesis stronger objections arise than to any of the preceding. It supposes a fluid to be secreted, and not from the blood, which is contrary to the rule observed by Nature in the other secretions, all of which are formed from the blood, and it renders the mammary arteries almost entirely useless.

When the stomach is empty, still there is some milk secreted, although in small quantity, and of a bad quality; if therefore we admit this hypothesis, there must be two ways of secreting milk, one directly, from the nourishment in the stomach, and the other, when no nourishment is in the stomach, from the blood in the mammary arteries.

And finally, to suppose a direct passage from the stomach to the breasts unobserved by anatomists, implies a degree of carelessness and want of attention, which ill accord with that spirit of minute investigation, and ardour for discovery, by which this class of men are peculiarly distinguished.

A sudden and profuse secretion of milk, after all, is not more difficult to be accounted for than the sudden and profuse secretion of tears which in some people attends pain and grief, or than the great augmentation of some other secretions from various exciting causes.

What is singular in the instance of milk, and occasions the peculiar difficulty, is, that its augmented secretion so immediately follows eating, that we are tempted

tempted to think, in spite of reason and anatomy, that it is the identical food received in the stomach, which in less than an hour after flows from the nurse's breasts in the form of milk. Difficulties unquestionably attend every explanation that has been given of this phænomenon. The following seems liable to the fewest, is the most simple, and I imagine the most probable.

When the nurse is faint from hunger, her circulation, as that of every person in the same state must be, is languid, and of course all the secretions are diminished; but after she has received a sufficient quantity of nourishing liquid food, it instantly acts as a stimulating cordial to the nerves of the stomach, with which all the nerves of the body have a wonderful sympathy; the circulation is quickened, every secretion is in some degree increased, part of the food is absorbed and carried into the circulation soon after it is swallowed, which causes a general fulness of the blood-vessels; the mammary arteries enlarge, and carry blood more rapidly and in greater quantities to the breasts; they are stimulated to secrete more in proportion than other glands, and thus the breasts of an exhausted nurse are filled with milk soon after a nourishing and restorative meal.

A glass of wine in some measure has the same effect; it gives a cordial stimulus to the nerves of the stomach, increases the circulation, and promotes secretion, but it does not keep up the secretion by pouring fresh juices into the blood. The effects of the wine decrease every moment after the first exertion of the constitutional powers it excites: The effects of a nourishing meal are more copious and permanent.

If however it is asked, how this stimulus is given to the breasts in particular, or why a plentiful meal should be followed by a flow of milk, rather than of

any other of the secreted juices, no satisfactory answer can be given, more than if it were asked why the breasts of women secrete milk after labour, and not before. We see the best reasons why it should be so, although we cannot discover by what means it is brought about; we must not attempt to explain final causes.

To return to the subject of secretion: In whatever way the secreted fluids are separated from the blood, or however their component particles are combined, it is certain that the secretion of some of those fluids is performed with, and in others without, the mediation of certain substances called glands.

The saliva, tears, bile, semen, urine, and some other fluids, are of the first class; the lymph, and the fluid thrown out of the body by sensible and insensible perspiration, of the second.

These last, as has been generally thought, are secreted from the blood without the aid of glands, and merely by the mechanism above described, of smaller vessels branching from larger ones, and draining a thinner from a thicker liquor.

The former are separated by the intervention of glandular substances of one kind or other; for we always find such substances at the places where those secretions are formed. We can see the secreted fluid flowing from them by a pipe called the excretory duct; we know that the gently touching or pressing certain glands promotes the secretion; and we know that when the glands are obstructed, or destroyed by disease, or entirely cut from the body, the secretion no longer takes place; so that there can be no shadow of doubt that glands are the agents of the secretion of the fluids in question.

A gland

A gland then is a substance contrived for the purpose of separating some particular liquor from the blood ; it is generally of a smooth surface, and separated from the adjacent parts by a fine membranous coat, which admits an artery and nerve to enter, and a vein to issue, along with a canal called the excretory duct of the gland.—They are either simple, in the language of anatomists conglobate ; or compound, otherwise called conglomerate.

The latter consists of a number of the former joined together in a cluster, each glandule of which has its distinct excretory duct ; these afterwards uniting, sometimes form three or four, and sometimes one large excretory canal.

As injections may be pushed from the arteries that seem to enter the substance of the glands, quite through to their excretory ducts, it is thought that the substance of glands is nothing but a congeries and convolution of arteries, adhering some more some less compactly, connected by an intervening cellular membrane, and terminating in an excretory duct. The vein which issues from the gland with the duct, conveys away the superfluous blood that remains after the secreted fluid is formed.

Such of the secreted fluids as are supposed to exist in the blood previous to secretion, and to be only mechanically mixed by the force of circulation, may, it is thought, be mechanically separated either without the intervention of glands, as the sweat, or by their means, as the urine and tears.—But there is more difficulty with those fluids which are thought not previously to have existed in the blood, and therefore could not be drawn from it by any arrangement of subordinate vessels, or any mechanical power whatever. The saliva, the s. men, the bile, the pancreatic juice, and some others,

it is imagined are of this class. By what power, it is asked, can the glands, from whose excretory ducts those fluids issue, produce liquors from the blood, which did not previously exist in it?

It was an ancient opinion, and is still the opinion of some physicians, that those fluids are formed in their respective secretory organs by the chymical operation of fermentation; by which term they mean some kind of change either by effervescence, coagulation, solution, precipitation, or otherwise, which the secreted fluid undergoes in the gland, by mixing with something of the nature of a ferment, which each gland contains.—Others treat this notion with derision, declaring that neither the blood nor any of the juices separated from it, are acid or alkali; that none of them can effervesce with acids or with alkalis, nor with each other, or by any of the other means produce the changes in question.

To which the supporters of the doctrine of ferments reply, that the particular ferment belonging to each gland is in such a small quantity, that no experiment can be tried upon it to ascertain what its nature is, or what are its powers; and when the blood arrives at the organ, the change immediately takes place, and the secreted fluid is formed. But this supposed ferment implies a previous ferment to form it, and that again another of elder date, and so the *elephant is supported on the back of a tortoise*, and the weight and perplexity is doubled.

What then is the result of the whole matter? Why, that every theory hitherto offered as an explanation of the manner in which the secretions are made, is liable to such insurmountable objections, that it is evident the process is not understood. It may be asked, why is not this acknowledged at once? And when people plainly see they do not understand

understand a subject, why do they not fairly own it, and save farther trouble to themselves and others?

That, to be sure, is the most simple and the most candid method, and is followed by some; but all the men of a learned profession and solemn character are not fond of adopting it; they possibly think it puts them too much on a level with those who have not such advantages.

However mysterious a subject may be, and however little light they can throw upon it, still they can talk about it and about it; they can, in support of their systems, bring conjectures in place of facts, and assertions for proofs; and when very hard pushed, they can call veteran phrases from Greece, and many frightful words to their assistance, till at last they raise such a cloud of technical dust, as conceals their ignorance, blinds the spectator, and makes him imagine that the mystery has been fully explained, although *he* has not capacity enough to follow and comprehend the demonstration.

When we get clear of this dust, however, and consider the subject uninfluenced by system or early prejudices, we are confounded to perceive how very ignorant indeed the most knowing are.

Yet it is right to know what has been thought on subjects of this nature, because in tracing the labyrinths of erroneous systems, a clue is sometimes found, which leads to the truth.

To return to our subject: If it is said that those secreted fluids which are known to be only mechanically mixed in the blood, by the motion and jumble of circulation, may be mechanically separated by the mere subordination of vessels; and that glands are only necessary when a great change is to be made, and a new fluid, as it were, formed: The instance of the urine, however, overturns this idea, it

it being a fluid which comes under the preceding description, where glands seem not necessary, but which nevertheless is separated by glands. The urine and the sweat are of the same nature with each other, and, as far as we can investigate them, they consist of the same substances ; yet the first is secreted by glands, and the other without. In general, however, it is true, that the fluids secreted by the intervention of glands are very different from the substances found in the blood, and what it seems impossible to imagine could be *mechanically* strained or separated from it ; those organs rather *appearing* to have a chymical or magic power of forming a new fluid, totally different from any thing that could have been expected to be formed from blood, or any of the juices of which it is composed. What can be more different from blood than bile ? Yet, as it has been already observed, the blood carried to the liver is the same in all sensible qualities with the rest of the blood in the veins ; and this gall, which can only be formed in the secretory vessels of the liver, being once formed there, can afterwards be taken up by all the secretory organs ; and in the jaundice is evidently to be seen in all the secretions. In short, we perceive that a most wonderful change is made in the blood that is carried to certain glands ; but we neither know how this change is performed, nor have we any conception what circumstance makes glands necessary for secretion ; nor can we perceive any thing in their structure that can lead us to presume *a priori*, that any one of the secreted liquors should necessarily be secreted by any one of the secreting organs, rather than by another ; for any thing that we can perceive, milk might have been secreted by the liver,—bile by the glands of the breast,—saliva by the kidneys, and so on.

It is true, we do see most evidently that they are infinitely better arranged ; but our discernment does not enable us to perceive, on what particular circumstance this admirable arrangement immediately depends.

Nor have we any idea how it happens that chyle, apparently the same, is formed from all the various kinds of food that mankind eat : Let them be fed on animal food alone, on vegetable food alone, or on a mixture of both, still the bland white fluid called chyle will be absorbed from them all. The milk of a nurse is still milk, with little or no apparent difference whether the woman is fed on roast beef, oatmeal, or potatoes.—Some one of these may, it is true, be more wholesome than the others, or a mixture of all may be preferable to any one ; but whether the nurse is confined to one, or allowed to feed on all, her milk will be essentially the same.

The formation of chyle and milk seems to be something very different then from simply separating by a subordination of vessels, or by any other means, the thinner from the thicker parts of a heterogeneous* liquor ; for if that alone were the case, we should naturally expect to find a different kind of chyle drawn from every different kind of food. Whereas the lacteals seem to possess, in the very moment of absorption, the power of assimilating into one uniform fluid all that infinite variety of different substances, which the voracity or caprice of mankind has appropriated for their food. But we know not on what principle this depends ; neither have we any conception by what means the human constitution converts vegetable and animal substances, the first with nearly as much facility as the second, into part of itself.

This, to be sure, is very wonderful ; but not more so than that a beech or oak sapling should by their roots,

* Of various natures.

roots, which contain, *their* absorbing vessels, imbibe the juices from the earth, and convert them into the substance of beech and oak.—How do the seeds thrown into the earth gradually increase in size, and springing from the same soil, take the various forms of all the different trees and vegetables?—How does the branch of one tree, engrafted on the branch of another, produce a different fruit from that of the trunk?—How do the absorbing vessels of a pear-branch draw juices out of an apple-tree, which are converted into pears, while every other branch sends fourth apples? All this remains unexplained. I therefore cannot be surprized, however much I may regret it, that it also remains unexplained how the various secretions are performed, or how the liver converts the same liquor into bile, from which other glands form mucus, or semen, or saliva.

. V. AB-

V.

ABSORPTION.

ABSORPTION is the next function of the vascular system to be considered.

This is performed by a set of vessels called absorbent, smaller, and, if possible, more numerous, than the blood-vessels.

Some of those vessels, it is said, have been occasionally seen and vaguely mentioned by the earliest medical writers; but those who assert this must acknowledge that those writers had no idea of their use, but speak of them in such a cursory manner that it is very doubtful whether they mean the vessels in question or not.

There are two kinds of absorbents, the lacteals and the lymphatics, each of them deriving their name from the appearance of the fluids they contain; the first being of a milky colour, the second pellucid.

About the beginning of the last century, *Astellius* discovered the former, and gave them the name they still have. Towards the middle of that century, *Pequet* traced them to the thoracic duct, and discovered that from thence their contents are carried to the subclavian vein, and not to the liver, as was till then believed. *Rudbec*, *Bartholin*, and others, about the same time demonstrated the second part of the absorbent system, called lymphatic, which has been more accurately examined by succeeding physicians, and whose nature lately, in a peculiar manner, engaged the attention of the most celebrated anatomists of this island.

The

The lacteals arise from the internal surface of the stomach and the alimentary canal; their office is to imbibe the most nutritious and finest part of the food (the chyle) and carry it to a reservoir where they all terminate, called the thoracic duct.

In their progress from the bowels to this duct, the lacteals pass along a membrane called the mesentery, to which the intestines are attached in such a manner as prevents their being entangled; an accident to which, so very long and so very flexible a pipe, confined in such small bounds, would otherwise be very liable.

There are a great many little substances, called mesenteric glands, dispersed over this membrane. The lacteals pass through these glands, in their way to the thoracic duct.

These glands, therefore, divide the lacteals into two portions;—that from the intestines to the glands, called by some the first, and that from the glands to the thoracic duct, called the second order of lacteals.

The whole alimentary canal is a continued pipe, whose various windings and circumvolutions within the belly prolong it generally to at least six times the length of the person to whom it belongs.

Though but a single pipe, we talk of it in the plural number, because it is divided by anatomists into six portions, to each of which they have given a name. Three of these form what are called the small guts—the remaining three, the great. The former make by much the longest portion of the whole canal, and there the lacteals are most numerous.

There are, however, a considerable number in the colon, which is the first of the large intestines; but few or none in the remaining two.

The wisdom of this is obvious and striking; for the food, by the time it arrives at the two last of the intestines, being almost entirely deprived of its nutritious

tritious juice, what remains begins to acquire an excrementitious taint, and is therefore improper to be absorbed and mixed with the blood.

The lacteal vessels which are found in the colon, and the few supposed to be in the two other large intestines, though in small numbers, suggested the practice of injecting clysters of nourishing broth and milk, in those diseases which destroy the power of swallowing. By the absorption of part of those injections, which may be thrown up as high as the colon, the patient has been supported till such time as the difficulty or impossibility of swallowing food was removed.

From this description it is evident, that whatever obstructs the passage of the chyle, and prevents it from being mixed with the blood, hinders the nourishment of the body as effectually as if no victuals were allowed to enter the stomach.

For although a person should eat plentifully of the most nourishing food, and although that food should be properly digested in his stomach and bowels, yet if the glands of the mesentery, through which the lacteals pass, are swelled and obstructed, the chyle will get no farther, the blood will receive no fresh supplies, and the body of course must waste away, and soon perish.

I have seen some remarkable instances of this species of consumption; one in particular, from various circumstances, made an indelible impression on my memory,—the case of a youth of fifteen years of age, distinguished by more brilliant personal advantages and nobler endowments of mind than I ever saw united at that period of life*. Assisted by the advice of Dr. Cullen, I attended this youth with the most anxious care

* Those particulars are foreign, no doubt, to the purpose of a work of this kind, and will perhaps be criticised as improper—
lets

care through the whole progress of his disease. In the bloom of health, without any apparent cause, he was observed to lose flesh, and gradually to waste away, although he complained of no particular uneasiness, had a strong appetite, and was indulged in a sufficient quantity of proper food. He retained his spirits to the last; but daily lost his flesh and strength, and at last expired without pain. On opening his body, all the viscera of the breast were found perfectly sound. The contents of the abdomen were all in the same condition, except the glands of the mesentery, which were swelled greatly beyond their natural size, and to all appearance entirely obstructed. No other cause could be assigned for the death of this youth but the chyle being 'stopped' at those glands, and excluded from the blood; so that he literally died for want of nourishment.

Some late anatomists assert that they have traced lacteals, in some particular subjects, all the way to the thoracic duct, without their passing through any of the mesenteric glands. This has not been observed, however, by others equally celebrated; so that such cases must be very rare; and even in the subjects where it was observed, only a very few were in this predicament; infinitely the greater number passing in the usual way, through the mesenteric glands.

The other kind of absorbents, called lymphatics, arise from the internal surface of the breast, belly, and every cavity of the body; they also overspread the whole external surface of the body; and large lymphatic vessels are usually found close to the

Let them.—At the distance of sixteen years, I have never yet, without some such impropriety, been able to mention this young man—

“ By me, so Heaven will have it, always mourn’d
“ And always honour’d.”—

the large blood-vessels of the extremities, besides those small superficial ones which lie above the muscles in the cellular membrane.

The large viscera generally have two sets of lymphatics, one lying on the surface of the viscus, and, the other accompanying the blood-vessels belonging to it.

That the use of the lacteals is to absorb the chyle from the food, and transmit it to the blood, has never been questioned. How could it? it admits of demonstration.—A few hours after an animal has been fed on milk, the same fluid found in the intestines is also seen in the lacteals.

As the lacteals and lymphatics are parts of the same system, when it was proved that the former were absorbent vessels, one might naturally have thought the second would also have been considered as such. This was not, however, the original opinion. It was imagined, on the contrary, that the lymphatics were not absorbents, but a kind of veins formed for the purpose of carrying the lymph from such arteries, as, being too small for circulating red blood, or even serum, admit lymph only.

The theory of the gradation of globules, it is probable, had a considerable effect in confirming and spreading this opinion, which kept its ground and was general even after Glisson, Hoffman, and others, had pointed out the real use of the lymphatics.

The faculty of absorption, although refused to the lymphatics, was ascribed, by many anatomists, to common veins; and this opinion continued to prevail, in some degree, until Hunter and Monro totally overturned it, exploding at the same time the notion that any of the lymphatics are continuations of arteries, and establishing, beyond a doubt, that all are absorbent vessels. The chief arguments for this opinion are :

1. The resemblance, in structure, between the lacteals, which are proved to be absorbents, and the lymphatics.
2. Both passing through glands.
3. Both terminating in the thoracic duct.
4. Both beginning from cavities, the lacteals from the cavities of the intestines, the lymphatics from the other cavities of the body.
5. The transmission of the venereal and other poisons, from the skin into the constitution ; as well as that of the virus of the small-pox, in inoculation—for this must be done by absorption ; and that this absorption is performed by the lymphatics, seems highly probable, because the lymphatic vessels, and the glands, through which they pass, are on those occasions found inflamed and swelled.

When the venereal infection, for instance, is received in the usual way, the lymphatic gland in the groin is apt to inflame, and form what is called a bubo. When the same (as sometimes happens) is received at a scratch or open wound in the finger, the lymphatic in the arm-pit is as apt to inflame and suppurate ; because in the first case, the absorbing lymphatic passes through the glands of the groin, and, in the second, through those of the arm-pit.

It also has been observed, that when the infection is communicated by the lips, the glands of the neck swell and are inflamed.

Abscesses sometimes occur in the arm-pit after inoculation, for the same reason ; and this was more frequently the case formerly, when a longer incision than at present was used.

When the absorbing power of the lymphatics was thus put beyond the reach of cavil, it was next asserted, that “ although they are absorbents,

“ yet

" yet the veins are absorbents also, the first being a mere
" appendage to the last ; for that the lymphatics are too
" few in number to perform alone such an important
" office ;" besides, it was added, " there are some
" parts of the body without lymphatics altogether."

The persevering labours of some late anatomists, particularly those of Mr. Cruikshank, have entirely removed the first objection : The researches of this gentleman alone demonstrate that the lymphatic vessels are more numerous than the veins. And with respect to the second, I understand he has traced those vessels to every part of the body except to the brain, the delicate structure of that organ putting a stop to the investigation ; but this accurate physiologist has done all that perhaps is possible, to prove that the brain is furnished with these vessels also, having discovered glands at the basis of the skull, through which there is every reason to think that lymphatic vessels pass from the brain.

The faculty of absorption being at length yielded exclusively to the lymphatics and lacteals, the structure of their mouths, and the means by which they are enabled to perform their functions, became a subject of much investigation and dispute.

Mr. Cruikshank, by the means of microscopes, saw the mouths of the absorbents, which he describes as arising from all the surfaces and cells of the body, in the same manner that they arose from the surfaces and cells of the absorbent glands, that is, by small orifices. Six, eight or ten of these orifices belong to as many small branches, which unite in forming the absorbent vessel.

Some physiologists imagine that their mouths being always open, fluids ascend into them, on the same principle that they ascend into capillary tubes.

Others imagine that the mouths of the absorbent vessels draw in liquor by forming a vacuum, in the same manner that is done by the mouths of infants on the breast, in the act of sucking.

The vessels in question are so minute, that they have baffled every attempt that has hitherto been made, even by means of the microscope, of ascertaining the structure of their mouths. The curious investigators therefore being able to procure no idea of their manner of operating, by the means of their eyes, have been obliged to have recourse to their imagination—and it must be owned that some of them have made use of the latitude which that affords with the utmost liberality. These vessels certainly seem to shew some selection with respect to the liquors they take in; they always absorb the nutritive part of the food in the first place, and never take any of the excrementitious but in the last extremity, and when nothing else can be had. And the force of their mouths is quite astonishing, and far surpasses what is displayed by any other vessels. Experiments with madder, to be mentioned hereafter, prove that their power of absorption is not confined to fluids.—And the phenomena of those experiments cannot be accounted for, without admitting that they absorb the solid bones themselves.

Other observations confirm this, and prove that there is a constant absorption and renewal of every part of the body without exception.

The first set of teeth that children receive have roots or fangs as well as the second; when they shed the first set, however, no roots are to be seen, of course they must have been absorbed. In very old people, their teeth sometimes drop out, from no other cause, but because the alveolar processes, or bony sockets, are entirely absorbed.

Some physiologists not being able to conceive how the mouths of any kind of vessels could possibly destroy hard bony substances, have supposed that a menstruum is separated from the blood, or from some of the juices, which dissolves the bones.

In this instance it happens, as it often does to those who, elated by philosophical pride, refuse to believe what they cannot comprehend ; they are forced to admit what is equally, if not more incomprehensible.

The physiologists above mentioned, cannot believe that the mouths of vessels can gradually and imperceptibly destroy the compact substance of bones ; but they can believe that vessels secrete a menstruum of such a corrosive nature as to destroy the hardest bones, but which is not capable of injuring their own soft and pliable substance. In whatever way they are to be explained, the powers and faculties of these vessels are so wonderful, as almost to justify the opinion of that gentleman who declares himself in equal admiration of the force their teeth display in destroying bones, and the good sense the vessels themselves display in the choice of aliment.

But after all, is it more difficult to understand how absorbents remove bones, than how arteries have deposited them ?—When the greatest philosopher has fully explained the latter, a man of plain sense may safely undertake to account for the former.

The liquor transmitted from the blood through small exhalent arteries, or organized passages, into the different cavities of the body, we formerly observed, serves various useful purposes.

The continual beating of the heart, and the frequent movement of the joints, make it peculiarly necessary that they should be kept constantly moist. The former is accordingly suspended in a membra-

nous sack, which contains a warm bland water, and all the joints have their ligaments and cavities supplied with a mucilaginous fluid, to preserve them in a flexible state, and render their motions smooth and easy : But as this secretion is regular and constant, not only those cavities, but the belly, breast, and others, would soon be too full, and the liquor would in time become rancid and acrimonious, if no means were provided to prevent such effects. This is the duty of the lymphatic vessels, which arising from those different cavities, absorb the superfluous liquor, and transnit it to the blood, where it again serves another useful purpose ; and so exquisitely are the two powers balanced, that of the vessels which lodge the fluid, with that of the vessels which absorb it, that in health, it neither stagnates nor overflows, but a just quantity of this lymph is kept up, not only in the joints and sack that contains the heart, but in every cavity of the body where it is deposited. This seems to be the great and constant office in which the lymphatic vessels are employed during health ; they also do essential service in certain complaints, external as well as internal. They suck up the extravasated blood which sometimes is diffused below the skin, and in the interstices of muscles, in consequence of blows, bruises, or sprains ; without which, such accidents would often be followed by more troublesome consequences than they are.

When the biliary ducts have been obstructed, and the gall-bladder is ready to burst, from the retention and accumulation of gall, the lymphatics are supposed, on some occasions, to have prevented this fatal event, by absorbing the obstructed bile, and relaxing the tension of the gall-bladder, till, by the power of art or of nature, the obstruction was removed.

They

They are occasionally supposed to perform the same salutary office when other glands are obstructed, and in other diseased states of the body.

A distinguished anatomist of this country imagines it is by the means of the lymphatic vessels that the body is constantly renewed, they taking up the old matter, while fresh supplies are constantly deposited from the blood.

This idea he supports by many ingenious arguments and observations. He mixed madder with the food of a growing pig; it is known that this root taken inwardly tinges the bones of animals of a deep red colour; so strongly are they imbued with this tint, that neither maceration in water or spirit of wine for weeks together, nor even boiling, is able to deprive them of it, or communicate the smallest tinge to those liquors. But if the animal is allowed to live, and after eating the madder, is fed on its usual food, after a certain time the red colour is gradually removed.

By feeding the animal alternately on this root and its usual food during stated intervals, on killing the pig, he found alternate layers of red and white in the bones, corresponding in thickness to the length of the intervals during which the animal had eat or been deprived of the madder.

From this and other observations it is concluded, that the lymphatics absorb and gradually carry off the hardest as well as the softest parts of our bodies, and are the instruments of the constant waste, as the arteries are of the constant renewal, of animal bodies.

The lymphatics on the surface of the body are thought to be constantly absorbing water from the atmosphere.

Without this we could not account for the vast quantity of water found in the belly in dropsies; many gallons have in some cases been collected within

a few days, though the patient has not drank so many pints during that period.

While so many different uses are found for the lacteals and lymphatic vessels, it is remarkable, that all the ingenuity of physicians and anatomists has not only failed in ascertaining the use of the glands through which they pass, but has not been able to form one probable conjecture on the subject.

Indeed there seems to be an impropriety in calling those substances by the name of glands ; for whatever their office is, it must be very different from that ascribed to all other glands, every one of which is supposed to separate a fluid of some kind or other from the blood ; at least, blood is evidently and directly carried to all other glands, and a very different liquor flows out of their excretory ducts ; whereas it is not blood, but chyle and lymph, which are carried to the mesenteric and lymphatic glands, and it is not a different, but the same fluid, apparently unchanged in any degree, that flows out of them.

When we perceive a liquor carried to any organ, and issue out of it quite altered in all its sensible qualities, we naturally conclude that the organ contributes in some way or other to the alteration ; but when the liquor seems to pass through without undergoing any change, we are at a loss to account for the organ's being placed in the course of the vessels, or indeed for its existence *.

Our

* Yet some very minute anatomists have asserted, that a white fluid is found in the cellular substance of the lymphatic glands of young animals, but not in those of old : They add, that this fluid is globular, and of course different from the lymph. It may be conjectured therefore, that the use of the glands is to separate this fluid ; but as this fluid, whatever is its use, makes no apparent change on the lymph, which issues out of the glands as pellucid as it entered, and as it is not found in old animals, the whole remains in as great obscurity as before the discovery of the white whole fluid.

Our perplexity is still greater, with respect to the mesenteric and lymphatic glands; for we not only cannot perceive what use they are of, but we can plainly perceive, that on particular occasions they are detrimental to health, as in the instances above mentioned, where their being affected in a particular manner, occasions marasmus* and other complaints: This however is only a strong instance of the limited nature of our faculties. The admirable mechanism of Nature in general, displayed in ten thousand astonishing examples, and the exquisite wisdom with which every part is adapted to its peculiar use, in the human frame in particular, leave us no room to doubt, that those numerous glands serve some essential purpose, although this has hitherto escaped the researches of physiologists,

What confirms this idea, if a thing so obvious required confirmation, is, that in proportion as the spirit of scrutinizing nature has advanced among mankind, new proofs have appeared of the infinite intelligence of its Author in the arrangement of all its parts; and some have been discovered to be essential, which were formerly thought superfluous.

VI. R E S-

* Marasmus. A particular kind of consumption.

VI.

RESPIRATION.

TH E digestion of our food, the circulation of the blood, secretion and absorption, though all essential to life, yet are not sufficient to preserve it even a few minutes, without the constant flowing of fresh air into the lungs, and its reflux back to the atmosphere. The first is called inspiration, the second expiration,—both respiration.

The thorax or chest in which the lungs are lodged, is composed of bones, cartilages and muscles, so artfully arranged, that its cavity may be considerably enlarged or diminished at pleasure. This is brought about, partly by the elevation of the ribs, and partly by the pulling down of the diaphragm or muscular partition, that divides the chest from the lower belly.

This partition naturally bulges convexly upwards, so as to encroach considerably on the cavity of the thorax; but on inspiration, it is pulled downwards from its convex to nearly a plain surface, and thus gives a space to the chest, which it takes from the lower belly.

The cavity of the chest therefore may be enlarged in two different directions,—by the elevation of the ribs it becomes wider, by the depression of the diaphragm it becomes deeper.

The external air has access to the lungs by the trachea or wind-pipe; the uppermost part of which, called the larynx, opens into the throat, by an aperture

ture called the glottis, and communicates with the atmosphere by the mouth and nostrils.

The trachea is a flexible pipe, composed of a series of cartilaginous rings, joined by muscular fibres; and lined with a membrane.

This tube, descending from the throat into the lungs, divides and ramifies in company with the numerous branches of the pulmonary artery, and with them and the veins forms that spungy substance called the lungs.

The pulmonary artery terminates in the pulmonary vein; but the branches of the trachea end in small membranous cells or bladders; so that there is not a circulation of air through the lungs, as there is of blood.

For the blood rushes in by one set of vessels (arteries) and returns by another set of vessels (veins); whereas the air, rushing in by the trachea, flowing through all its ramifications, and extending to its most remote cells, returns to the atmosphere by the same way it entered. The organs concerned in this are partly active, and partly passive. The intercostal muscles and diaphragm are of the first kind, the lungs themselves of the second.

When the intercostal muscles elevate the chest, which the cross direction of their fibres, and the peculiar articulation of the ribs, admirably enable them to do; and when the diaphragm is drawn downwards, the cavity of the thorax is enlarged, and the air within the lungs expanded, in proportion to the acquired space. This air, of course, becomes rarer and specifically lighter than it was before.

But it was then in equilibrio with the atmosphere; and this equilibrium being now removed by the expansion, the external air enters the larynx, and flows through all the branches of the trachea, restoring the

the balance between the ambient air and that in the lungs.

Whether the chest is swelled by inspiration, or depressed by expiration, the lungs fill exactly the whole cavity, and are always in contact with the pleura, which is the name of the membrane that lines the internal surface of the thorax ; no air being permitted between this membrane and the external surface of the lungs, for if there was, the lungs could not possibly play, as this air would counterbalance the pressure of the atmosphere.

So many organs being subservient to respiration, and this important function being performed by the means of such curious and complicated mechanism, we need not be surprized to find that various attempts have been made to explain the immediate cause that excites this function. We are told of the compression of certain nerves, the interruption of certain secretions, the stimulus given the lungs by the blood rushing into the pulmonary artery, the alternate contraction of antagonist muscles, those of inspiration relaxing those of expiration, &c. &c. but, after all, the matter remains unexplained to this day, unless what follows can be considered as an explanation ; for when stripped of improbable conjecture, ostentatious and technical terms, and superfluous language, the volumes that have been written on the subject amount to this :

We have a sensation which excites us to expand our chest, the action accompanies the inclination, and the air flows into the lungs ;—when enough is admitted to answer the purposes of health, we feel an equal desire of expelling it, which is directly followed by the accomplishment of our desire ; and those alternate feelings are constantly renewed and gratified, with or without reflexion, asleep as well as awake, while life lasts.

A peasant would have said it in still fewer words—
“ We breathe in consequence of its being in our pow-
“ er ;

"er; and because pain and death would be the effect
"of our not breathing."

Physiologists are not agreed with regard to all the uses of the lungs, or the benefits resulting to the body from breathing. Some of those, however, are evident and undisputed. No body can doubt that by their means the voice is modulated, the power of speech is given to man, and, by the air entering the nostrils and conveying effluvia, breathing becomes instrumental to the sense of smelling. Other uses have been assigned to this function, which, though they seem manifest to some, are not so universally admitted.

One opinion is, that, as the chyle is thrown into the blood a little before it circulates through the lungs, the great use of this circulation is to blend the two liquors intimately together, and complete the process of sanguification before the blood is dispersed for the nourishment of every part of the body: Another opinion is, that the blood is attenuated in the lungs: Another, that it is condensed there: And some think that the particles of blood receive their globular form there. Still another use imputed to the lungs, is to allow of the discharge of watery vapour in respiration, without which the blood, it is said, could not retain its due density; and other inconveniences would result. Others have imagined that the blood acquires its heat in the pulmonary artery; and that the action of the lungs contributes greatly to that useful purpose.

It is evident that heat must flow in every animal from some internal source; for the warmth of their bodies being usually greater than that of the atmosphere, they must lend heat to the air; but can borrow none from it. So, as there is a constant waste, there must be a constant reproduction. What that is, and where

where it originates, has long been and still is a matter of dispute.

One opinion, as was above hinted, is, that the blood acquires its heat chiefly in the Lungs.

That animal heat depends upon the action of the arteries, and the circulation of the blood in general, is very natural to imagine; because whatever increases the velocity of the circulation, whether exercise, friction, or disease, also increases the internal heat; whereas fainting, hemorrhage, and whatever produces a weak and languid circulation, also diminishes the heat of the body.

When a ligature is put around an artery so as to prevent the blood from being carried to any particular limb, that limb becomes colder than it was, and does not recover its natural heat, till by the expansion of the lateral branches, which go off from the tied artery above the ligature, the usual quantity of blood is circulated through the limb.

Those who believe that animal heat arises from the circulation, imagine it is immediately produced by the attrition of the particles of blood with each other; and with the sides of the vessels through which they flow; and as this attrition is greatest in the circulation through the pulmonary artery, because there the globules are not only rubbed by the action it has in common with other arteries, but also by the constant and peculiar action of the lungs, of course they conclude that animal heat is principally generated there.

This reasoning would be irresistible, if the facts which support it were not opposed by facts which have a contrary tendency. For, although the body cannot long retain heat without the circulation in general, and *that* through the lungs in particular, although the body acquires additional heat in proportion to the force of the circulation, although the increased action

of the whole body or of any part increases the heat, and although the attrition of solid bodies on each other never fails to generate heat ; yet no attrition or agitation of fluids against solids, or of very small particles of a solid plunged in a fluid against each other, has the same effect.

Take any quantity of blood out of the body, let it be agitated in the most violent manner for any length of time, yet neither the friction of the red particles against each other, or against the sides of the vessel, will produce the smallest heat.

To obviate the force of this very strong objection, it has been observed that we cannot safely draw conclusions concerning the effects of any process of the animal economy, from experiments made in imitation of them out of the body, the original being always so different from the copy ; any artificial agitation we can give to blood or other fluids out of the body is so different from that of the circulation in it, that we ought not *positively* to conclude, from no heat being produced by the first, that none will be produced by the second, especially as we find that the existence, increase, diminution, and absence of animal heat, always accompany the existence, increase, diminution and absence of the blood's circulation.

The general import of this observation is just ; yet as no friction or agitation of fluids against solids, however violent, not even the impetuous dashing of torrents upon rocks, produce heat, we certainly have no argument from analogy that animal heat proceeds from the friction of the circulating fluids upon the solids.

The chymical commotion arising from fermentation indeed produces heat ; but there is no evidence of any such thing ever taking place in the bodies of living animals. And even were we to adopt the opinion that some of the secreted fluids are formed in their secretory organs

gans by fermentation, this could not account for animal heat; for its cause, be it what it will, cannot be occasional or partial, but constant and universal, as the effect it produces; and it must also be reconcilable with this fact, that increasing the force of the circulation, by whatever means, increases the heat.

There are fluids, however, which on being mixed generate heat without effervescence or any visible commotion. This is the case on mixing spirit of vitriol and water, and in other instances; but whether any thing of the same nature can be supposed to take place in the body, or by the mixture of the different fluids of which the blood consists, or whether it can be supposed to operate in conjunction with the action of the arteries and the lungs (which seem to be intimately connected at least with the production of heat) I will not venture to determine.

An explanation of the manner in which animals acquire and retain heat, and from what sources fresh supplies are constantly drawn, has been so often attempted, that one would naturally imagine there was something more curious and attracting in this than in investigating any of the other causes of heat.

All the known sources of heat are :

1. The sun.
2. Burning fuel.
3. The attrition of solid bodies.
4. Fermentation.
5. The chymical union of bodies.
6. The bodies of living animals and vegetables.

And it is remarkable, that every explanation of the latter is founded on a supposition that the heat is derived from some of the five preceding sources.

We have already observed that it has been imputed to attrition and fermentation; of late it has been suggested (and the doctrine is supported with ingenuity) that

that the stomach is the principal seat of animal heat, and that it arises from the decomposition of food*.

It was formerly hinted by another philosopher, that a fluid fire is attracted by plants in their growth, and becomes consolidated with their substance, which is the source of vegetable heat; and when the plants are decomposed by fermentation, digestion, or otherwise, the fire recovers its fluidity, and escapes.

Here then are three suppositions; fire is a fluid; plants have the property of attracting this fluid; and, in the third place, the power of consolidating it. The three together form a mass of difficulties, at least as great as that they are intended to remove.

Indeed every attempt to explain the origin of animal or vegetable heat is open to this objection, of being founded on some hypothesis at least as inexplicable as the phænomenon it should explain.

I own I can see no exclusive title that animal heat has to the labour and ingenuity of physiologists; but if they choose to give a preference to it over the other sources of heat, they should found their hypotheses on some other foundation than a supposed analogy with phænomena which are themselves unexplained. It affords not a great deal more satisfaction to my mind to tell me that animal heat is owing to attrition, than it would to assure me that the warmth which accompanies attrition is owing to animal heat; for, in my apprehension, to endeavour to explain a thing of whose nature we are ignorant, by telling us it is like another thing, of whose nature we are equally ignorant, cannot make us a vast deal the wiser.

It is Bays' answer to Smith, in the Rehearsal—

I am not acquainted with this Amaryllis, says Mr. Smith: Pray, who is she?

H

Amaryllis,

* Theory of the Production of Animal Heat, by Mr. Rigby.

Amaryllis, replied Bays, is sister to Parthenissa.

But unfortunately Parthenissa had never before been heard of.

On the whole, as animal heat is evidently independent of the sun's heat—for a living body always retains nearly the same degree of heat, although placed in an atmosphere much colder or hotter than itself, while a dead body, and all other matter, acquires the same degree of heat with the surrounding atmosphere, and all explanations of animal heat, founded on its analogy with attrition, being in their nature unsatisfactory, I am afraid we must allow the bodies of living animals and vegetables to form a sixth original cause of heat, as much beyond our power of explaining as the source of the sun's heat.

To return to our subject, from which we have deviated too far: However much respiration may be supposed to contribute to speech, smelling, sanguification, or even to the generation of heat, still it will be difficult to account for the almost instantaneous extinction of life which follows a stoppage of breathing. From the uses of the lungs, above enumerated, we perceive, indeed, that death must in a *certain time* be the consequence of their ceasing to act; but death's happening *so immediately* must depend on some other circumstance.

It has been found that air cannot be retained many minutes within the lungs, nor can we long respire the same air, nor air which has served the inflammation of fuel, without the most fatal consequences.

Since therefore we cannot live without breathing, we either draw from the air something salutary and essential to life, or else throw out of our bodies something pernicious and destructive; but there is no evidence of our drawing any thing peculiarly salutary from the air,^x and there is evidence of our communicating something highly pernicious to it. For the air

^x Had our Author been acquainted with the New Chemical Theories he would not be " "

is vitiated by breathing to such a degree, that when a crowd of people are confined in any place where there is not a free ventilation, the air becomes absolutely pestilential, and acts as a mortal poison. And air which has been once respired is immediately so altered, that when it is collected, fuel or a burning candle cannot burn in it.

As the whole blood of the body, therefore, passes through the lungs, and is there brought almost into contact with the atmosphere, we must conclude, that in the act of breathing the blood throws off that noxious quality which respiration acquires; and that this is the principal purpose of respiration.

That ingenious and candid philosopher, Dr. Priestley, has demonstrated that the noxious matter thrown from the blood in breathing is phlogiston*.

VII. THE

* Vide Philosophical Transactions of the Royal Society of London, Vol. LXVI. p. 226.

VII.

THE NERVOUS SYSTEM.

THE human body is often called a machine by anatomists and medical writers; few of its powers however, or indeed of those of any animal, can be explained on mechanical principles.

If the most acute writers have failed, when they applied that kind of reasoning to the vascular system, with which the mechanic powers and principles have some analogy, an attempt of the same nature on the nervous, with which they have none, would be absurd.

The faculty of feeling, and the immediate and violent effects which particular sensations have on the animal economy, must forever distinguish its operations from those of every work, however perfect, constructed upon the laws of mechanism.

The principles and powers of the latter we *understand*, and we know the effect to be produced. We *see* the effects of the former; but a knowledge of the principles and powers by which they are produced, has hitherto eluded human comprehension.

That part of the human body called the nervous system consists,

First, of a large pulpy mass, called the brain, which fills the cavity of the skull; and, in a man, is larger in proportion to the body, than in any other animal.

Secondly, of another white substance, proceeding from the former, passing through the basis of the skull,

skull, and descending like a pulpy rope within a long cylindrical cavity formed by the bones of the spine; this long white substance is called the spinal marrow.

Thirdly, of masses of fibres or filaments, like white threads, detached from the brain and spinal marrow, to all the various parts of the body.

Anatomists generally reckon forty pair of nerves in all; ten of which arise from the brain,—the remaining thirty pair, from the spinal marrow.

The first are distributed to the organs of smelling, of hearing, of sight and of taste, to the larynx*, and those parts subservient to the voice and action of swallowing, to the head in general; and some of them send branches to the lungs and stomach.

Of the thirty pair of nerves which issue from the spinal marrow, seven go out between the vertebræ § of the neck,—twelve between those of the back,—five from the loins, and six from the false vertebræ, and are dispersed over every part, external as well as internal, of the body.

These forty pair spring directly from the brain or spinal marrow; but there is another pair of nerves, concerning which different opinions are entertained by anatomists; the most probable seems to be, that they come from the brain, in conjunction with the fifth and sixth pair, descending along both sides of the spine from the top to the bottom, and communicating in their course with all the nerves which come from the spinal marrow. They are called the intercostal nerves, and are supposed to be eminently instrumental in producing that universal sympathy which prevails all over the body.

The nerves are enveloped as they issue from the skull and the vertebræ, in prolongations of the dura

* Larynx. The upper part of the wind-pipe.

§ Vertebræ. The chain of bones which descends from the basis of the skull to the lower part of the loins.

mater ||, and then seem pretty strong inelastic cords ; some people imagine they derive this strength entirely from that membrane, being of themselves soft and tender like the brain ;—this however is not fully ascertained.

The brain itself appears such a gross inert mass of matter, that perhaps there is no organ of the human body that we should have less suspected of being connected with thought.

But although we can form no idea how this connection subsists, or by what means the nerves are the organs of sensation and motion, yet we cannot have any doubt of their being both.

The circumstances which lead us to this opinion, and confirm us in it, are curious in themselves ; and a knowledge of them is useful in the practice of medicine.

We are led to conclude that the brain is the seat of thought,

First, From a feeling we all have, that imagination, memory, judgment, and all the faculties of our minds, are exercised within the head ; the cavity of which is completely filled with brain.

Secondly, Because a long exertion of thought is as apt to create a head-ach, as an excessive exertion of the arms or legs is to produce uneasiness in those members.

Thirdly, Because the nerves, which serve four of our five senses, the smell, the taste, the sight, and the hearing, take their origin *directly* from the brain ; and those which do not, take it *indirectly*, by the intervention of the spinal marrow.

Fourthly, Because whatever destroys the nerves belonging to any organ, effectually deprives us of the use of that organ. An obstruction in the optic

nerve,

|| Dura mater. A membrane which lines the cavity of the skull, and covers the brain.

nerve, for example, produces complete blindness, although the visible parts of the eyes remain perfectly sound.

Fifthly, Because the cutting or tying a nerve, going to any particular limb, destroys all sensation and power of motion in the part below the section or ligature.

Sixthly, Because a dislocation of the vertebræ of the loins, by which the spinal marrow is compressed, numbs the sensation of the lower extremities, and renders them paralytic.

Seventhly, Because cutting quite through the spinal marrow at the vertebræ of the neck, destroys all nervous communication between the head and the body ; the vital motions of respiration, and the circulation of the blood must cease, and of course the person dies*.

Finding that when the nerves going from the brain or spinal marrow to any part of the body are destroyed, the sensation and powers of that part are also destroyed ; we might naturally infer, that when the substance of the brain itself is injured, its functions would be impaired.

We accordingly find, that this in fact is the case, and that the functions of the brain are impaired in proportion to the injury.

A wound or disease, which essentially destroys the organization of the brain, immediately destroys thought and sensation, and the person instantly dies.

Whatever confines or injures the brain, disturbs thought.

A blow on the head has rendered a man of acuteness stupid during the remainder of his life.

* It is evident, from the cause assigned above, that death must soon ensue,—but the person dies instantly, the reason of which is not so clear.

A bad conformation of the skull, or some disease in the substance of the brain, are among the causes of ideotism.

The brains of madmen are generally found of an unnatural hardness or weight.

A small pressure of the brain diminishes, a stronger destroys the sensibility of the whole body.

When part of the skull has been beat in, so as to occasion a compression of the brain, without injuring it otherwise, the patient continues in a state of drowsiness or perfect insensibility ; let the skull be raised by the surgeon's art, and the pressure removed, the patient gradually awakes as if from a deep sleep, and regains the exercise of his understanding.

There was, some years since, a beggar at Paris, a considerable part of whose skull had been removed without injuring the brain, in consequence of a wound. This being healed, he wore a plate upon the part where the skull was wanting, to prevent the brain from being hurt by every accidental touch.

For a small piece of money this poor creature took off the plate, and allowed the brain to be gently pressed, by laying a handkerchief, or some such soft substance, upon it ; this immediately occasioned dimness of sight and drowsiness ; the pressure being somewhat augmented, he became quite insensible, with high breathing, and every symptom of a person in an apoplexy ; from which state he never failed soon to recover, upon the pressure being removed. As this experiment was attended with no pain, it was often repeated, and always with the same effect.

From these observations it seems evident, that the brain is the seat of thought ; and that a communication is kept up, by the intervention of the nerves,

nerves, between this sensorium and all the parts of the body.

In preserving this communication, the nerves perform two distinct offices.

One is, conveying sensation from all parts of the body to the brain: Whatever impression is made, whether of an agreeable or disagreeable nature, on any part of the body, immediate intelligence of it is conveyed by those faithful centinels to the seat of reason.

The other office performed by the nerves, is carrying the commands of the will from that seat to all the different parts of the body; in consequence of which the limbs and body are moved, in a great variety of directions, as the will ordains. For most of the muscles of the body which produce motion, are in the guidance of our will; some of them, however, are entirely independent of it, as those of the heart, and vessels which carry on the circulation of the blood; and some are partly under the direction of our will, and partly independent of it, as those of respiration.

But all muscles, the involuntary as well as the voluntary, are enabled to act, only by their communication with the brain; for when that is cut off by the destruction of the connecting nerve, whatever impression is made on the part, can no longer be felt; the orders of the will to that part can no longer be obeyed, and the part itself can no longer move, or at least it can move only for a short time, by a power of a peculiar nature, belonging to muscular fibres, which shall be mentioned more particularly hereafter.

As nerves are dispersed to almost every part of the body, almost every part of the body is endowed with feeling, but in very different proportions; some parts having a much more delicate sensation than others.

The bones, cartilages, ligaments, and tendons, in a sound state, seem insensible.—Nerves have been traced into bones ; I believe none have yet been discovered going directly into the cartilages, ligaments, or tendons.

We have no doubt, however, of these being furnished with them also, because in particular situations they have sensibility.

The bones and other parts of little or no sensibility, when in a sound state, are subject to very acute and permanent pain in a state of inflammation : We know this by the effects of the venereal disease, of the rheumatism, and of the gout.¹

A prodigious quantity of nervous filaments is dispersed to the skin, and minutely interwoven with its substance ; the feeling of this tegument, therefore, is exquisite, and were it not covered and blunted by the insensible cuticle or skarf skin, the commonest actions of our lives would be insupportable ; but having this thin and insensible membrane admirably spread over every part of it, the clothes, and other substances which necessarily come in contact with the body, give no pain, and many feelings are rendered indifferent or pleasing, which otherwise would have been agonizing.

The only parts of the body that seem to be entirely and in every state insensible, are the hair, the nails, the skarf skin, and perhaps the enamel of the teeth.

As the first two often require to be cut, it would have been unfortunate for mankind if they had been endowed with feeling.

The perfect insensibility of the cuticle protects us from the torture which every movement of the body would otherwise have occasioned, while its thinness permits that degree of sensation that is necessary for warning us to avoid the shock of destructive

tive substances ; and in a thousand instances conduces to our safety, our ease, and our pleasure.

The enamel, in some measure, performs the same good office to the softer bony part of the teeth, that the cuticle does to the skin ; the wisdom and benevolence of the Author of Nature being equally conspicuous in the formation of those parts, which are deprived of all feeling, as in those which convey the most agreeable sensations.

It has been already observed, that four of our five senses are confined to the head ; each of these four have organs exquisitely formed for their uses, with proper receptacles adapted to their nature, contrived for their convenience and protection ; and there alone their functions are exercised. The fifth sense, that of feeling, belongs to the whole body, but is most accurately exercised by the hands.

Many of the brute creation enjoy the organs of the senses in common with man, and possess some of the senses, particularly that of smelling, in greater perfection than any of the human race ; but the touch they certainly have in a far inferior degree : For besides the more perfect sensation that man must have all over the body, from the delicacy of the skarf skin ; the make and sensibility of his hands render his touch infinitely more accurate than that of any other animal. There is certainly nothing in the external form of man, which gives him so many advantages over other animals, as the admirable mechanism of his hands.

It has been remarked, that even brutes are intelligent in proportion to the accuracy of their feeling, or as their extremities approach in resemblance to the human hand. The horse and the bull, whose feet are covered with callous hoofs, are less intelligent than the dog, and the dog is inferior in acuteness to the ape, who has a rude kind of hand.

Independent of other more important advantages, the superiority which the wonderful contrivance of this member gives to man, is prodigious: By the variety of its motion in all directions; by its division into fingers, and by their flexibility, it is enabled to ply round every substance; by the exactness of its touch, to convey a just notion of every form; by its strength, it enables man to rear fabrics to conveniency, to magnificence, and to devotion; by its dexterity, to imprint upon stone and upon canvas the most beautiful imitations of nature, and the sublime conceptions of genius; and by its united powers, to form and wield weapons more formidable than the paw of the lion, or the proboscis of the elephant.

It cannot be denied, however, that with the external senses, many of the brute creation are endowed, in common with man, with several faculties of a more refined nature. Some people, whether from a high opinion of other animals, or a humble one of human nature, I shall not take upon me to say, have struggled hard to bring the one as near to the other as they could, or put them quite upon a level, if possible.

By those advocates for the brute creation we are told that they are actuated by the passions of fear, of grief, of joy, of anger, and of jealousy, as well as men; that they possess the virtues of fidelity and gratitude in a higher degree.

That the greatest heroes have not surpassed them in courage; that they even display that quality independent of any advantage to be acquired, and from no apparent motive, but a generous spirit of emulation, and a disdain of turning their backs upon danger.

That they affectionately tend, and carefully provide for their young; and with a prudent attention

tion to their own future welfare, they prepare for the scarcity of winter, by carefully heaping up provisions during the abundance of summer.

That to avoid the inconveniences and severity of northern winters, they cross vast deserts and seas in search of more genial climes ; and prompted by a predilection, a patriotic attachment, they return at the approach of summer to their native country.

That they uniformly follow that plan of life which is most suitable to their respective natures, and never, misled by vain hopes and fantastic desires, deviate, like man, into the paths which lead to misery and remorse.

That they are not obliged, as men are, to search after remedies for their distempers, by dangerous trials and laborious experience, nor to trust the care of their healths to a combination of selfish mercenaries ; but when by accident they are sick, which is seldom the case, they find their cure at once, by an intuitive faculty, without any trouble.

After having admitted, in its fullest extent, every fair comparison that can be made between man and the most perfect of the other animals, acknowledging that both have bodies of matter organized in many respects alike ; that the bodies of both are made up of bones, muscles, and blood-vessels, organs of respiration, circulation, and digestion ; that both have brain and nerves apparently of the same substance and texture ; that in both, those are the organs of will, of sensation and of motion ; that both possess five senses of the same nature, and have a resemblance in many of their appetites and inclinations ; after all those concessions, the internal faculties of the most intelligent of the brute creation will be found, upon a just estimation, at a prodigious distance beneath those of men.

The actions of the one seeming to proceed from the impulse of some want, the incitement of some appetite, or some controlling spring within them, which obliges them to perform the same thing in the same manner ; all their boasted works, the labours of every species, and of every individual of the species, are as uniform as if they had been all cast in the same mould. This appears in their nests, in their cells, in the labours of the ant, the bee, and the beaver ; all their works are formed by an invariable accumulation, a necessary attraction and deposition of matter, like the growing of a plant or the crystallization of a salt.

One race of the most intelligent species never improves upon a former, nor one individual upon another. At the end of the elephant's long life, what does he know that he did not know at the beginning ? What does the young elephant learn from the experience of his father ?

There is no æra of greater brightness than another in the history of any animal but man ; all, from the earliest records of time to the present moment, is one uniform period of far greater darkness than any recorded in the annals of mankind.

And if it is urged that there may have been some unrecorded æra of human society wherein men were in a state of equal darkness, it must be allowed that they have emerged out of it, which equally proves the great superiority of their nature.

Speech, that wonderful faculty by which men convey to each other every emotion of their heart and every idea of their mind, is natural to all the human race, even to the most uncultivated negro and savage, but is unknown to the wisest of all other animals. Is this owing to a defect in the organs of speech ? No. In some animals those organs seem sufficiently capable of it, and some have been taught to pronounce sentences,

sentences, but none to understand what they pronounced ; for language implies a chain of connected ideas superior to what any animal but man seems able to attain.

How comes it, that with so much sagacity and reflection as some people contend certain animals possess, the strongest and the shrewdest among them have not made the weaker and less intelligent subservient to their use ? How comes it, that the most uncultivated of the human species have from the beginning of time made the most powerful and knowing of the brute creation subservient to theirs ? If by his external form man has some advantages over them, by forming an alliance they might soon overbalance this, and free themselves from subjection. What human force could stand against an allied army of lions, elephants and eagles, if they had judgment to use their superior powers ?

Even attention to their young, the most universal and most amiable part of the character of irrational animals, seems independent of sentiment and reflection, and to proceed from the blind impulse which prompts them to the choice of plants in sickness, to accumulate provisions, and build cells ; for after a short period those young are entirely neglected, and no trace of affection, or the smallest tender recollection, seems any longer to subsist between the parent and the child.

How different is this from the sensations of the human species, where the father and mother feel their youth restored, and their existence multiplied in their children, whom they endeavour to turn from the allurements of folly, and by creating in their minds a desire of knowledge and useful attainments, they save from the wretchedness of vacancy, and the contempt attendant upon ignorance ; who encourage their exertions, support them under disappointment, whose chief happiness

happiness depends on the prosperity of their offspring, and who feel the approach of age without sadness, while the evening of their lives is brightened by the rising reputation of their children.

Notwithstanding the analogy which has been pointed out in the structure of animals, which is thought to be continued by a gradual and almost unbroken chain of connection from man down to the most insensible of the animal world, and from thence carried equally entire through the vegetable, this analogy is in the bodily structure only; for when we turn our reflections to the reasoning faculties of man, and the endowments of the human soul, the distance between this and the highest intelligence of any other animal is infinite. The only advantage that other animals can be supposed to have over man is, that being excluded by their nature from all mental enjoyments, they are also secured from all the pains and disquietudes that proceed from the same source; but to acquire an exemption from disquietude at the expence of being equally exempted from all the delicate feelings of the mind and affections of the heart, is a purchase which I hope no honest mind will ever be willing to make. An ingenious lady, in a celebrated *Ode, seems, however, desirous of the exchange; but the most scrupulous observers of truth on other occasions, are permitted to be insincere in poetry. If this indulgence is granted in proportion to the poetic talent displayed, few people have a right to so great a share as this lady.

It was observed above, that as often as an impression is made upon any part of the body, a sensation proportionable to the force of the impression and to the sensibility of the part is instantly carried by the nerves to the brain, and our attention is directly called to the part affected.

But

* Ode to Indifference, by Mrs. Greville

But it sometimes happens that when the impression is really made upon one part, the sensation is perceived as if it were altogether, or in the greatest degree, in another, at perhaps a considerable distance.

Thus an affection of the liver often occasions a pain in the right shoulder.

This circumstance of one part feeling when another is injured, being similar to the concern which a person of humanity takes in the distresses of his fellow-creatures, has procured it the name of sympathy.

There are some particular impressions which occasion an almost universal sympathy all over the body.

Cold water thrown upon a warm part of the body produces a sudden contraction of all the external fibres.

Tickling the soles of the feet will throw almost the whole muscles of the body of many people into convulsions.

A glass of wine or of brandy received into the stomach of a person exhausted with fatigue and ready to faint, gives instantaneous spirits and fresh vigour : This must proceed from the manner it affects the nerves of the stomach, and their being sympathised with by the rest of the body, as there is not time for the liquor being conveyed into the blood in the usual manner.

When a fever arises in consequence of a wound, or of any local affection, it must be owing to the sympathy between the part affected and the constitution in general.

There are certain parts of so much importance to life, that they cannot be affected, even in a moderate degree, without occasioning a general sympathy, or in other words, disturbing the whole constitution ; such are, the brain, stomach, and vital organs.

But even the least important parts of the body endowed with sensibility, when they are violently affected, produce also universal sympathy: Thus a severe toothach occasions a considerable degree of fever.

Worms irritating the nerves of the intestines sometimes occasion fever, sometimes convulsions, and often itching in the nostrils.

The teething of infants often produces purging and fever, and sometimes convulsions.

Besides the general sympathy of the constitution with certain parts of the body, there are also many particular sympathies between two particular parts.

A disease of the liver producing pain in the right shoulder has been already mentioned.

Any thing irritating the kidneys, and for example passing from thence to the bladder, occasions a vomiting.

A rough stone in the bladder produces a pain at the end of the urethra.

The stomach not only is more universally sympathised with than other organs, but also has a greater number of distinct reciprocal sympathies with particular parts of the body, than any other organ.

A blow on the head occasions vomiting.

A disordered stomach often excites a headach. The headach which is apt to come after drinking too much wine or other strong liquors, certainly proceeds from the stomach, and sometimes is diminished or entirely removed by a dram.

The tremor or shaking in the hands to which habitual drunkards are subject, is palliated by the same insidious remedy.

A disordered stomach with indigestion, is often accompanied with flushings in the face, with palpitations at the heart, with intermitting pulse, with difficult breathing, with dejection of spirits, with an uncommon

mon sensibility to any unexpected sight or noise, and with giddiness.

The sight or smell of grateful food produces an augmented flow of saliva.

Whatever produces a nausea has the same effect.

A draught of very cold water, or eating iced creams, gives a pain in the nose near the forehead. Harsh sounds affect the teeth.

Eunuchs have no beards; and their voices are different from those of other men: This shews a sympathy between remote parts, which no anatomists could have suspected, from communication of nerves or otherwise.

A mutual sympathy is observable not only between different parts of the same body, but our bodies are also affected by the impression which various things unconnected with them make upon our minds.

Some people faint at the sight of blood, even when it is made to flow from the vein of another, on account of his health.

Others complain of an uneasy sensation in their own eyes, on looking stedfastly at the inflamed eyes of another person.

Every sentiment of the mind has particular parts of the body in correspondence with it, and affected by it.

A ridiculous scene passing before the eyes, or even recounted to us, throws us into a convulsion of laughter.

In the same manner an affecting scene, or an affecting story, excite the function of the lachrymal glands, and we shed tears.

Any instance of great oppression or injustice which we see or hear of, produces instant marks of indignation in our countenances.

If we ourselves are the objects of injustice or insults, anger and rage will be very apparent in the muscles of our face.

A solemn or awful scene naturally composes the countenances of the spectators into an uniform solemnity of features.

Hatred, scorn, love, suspicion, confidence, admiration, and every other passion or emotion of the mind, have particular muscles in sympathy with them, and affect the features in a particular manner. So that in remote villages, and in those countries where the emotions of the heart are not attempted to be concealed or disguised, it is an easy matter to know the state of men's minds by looking in their faces. But in more artificial society, in great cities, and in courts, where many are struggling for the same object, where there is an everlasting rivalry and jarring of interest, where men are anxious to conceal their designs and their wishes, and dare not avow the real motives of their actions, it is difficult to judge of the feelings of the heart by what appears in the countenance; yet in the midst of all this affectation and disguise, men of experience and penetration will often see real joy through artificial tears, genuine sadness in assumed gaiety, and inveterate hatred lurking under all the officious smiling display of kindness.

Art cannot long carry on a successful war with nature; men cannot be always on their guard, or keep their features in everlasting constraint; the genuine passion will occasionally shew itself in the countenance by the sympathising muscles; the hypocrite is that instant detected, and all his future grimaces are in vain. These last examples are the natural expressions of the passions, and perhaps cannot with strict propriety be given as instances of sympathy.

But, independent of the passions and affections of our own minds, the mere expressions of them in the

the features of others is apt to produce an imitation of these expressions in our own features.

There seems to be such a degree of sensibility or sympathy in the muscles of the human face, that they spontaneously give an expression correspondent with what we behold in the features of another person, even although we are ignorant of the cause which excites it. One person yawning, will prompt others to yawn almost as effectually as a long piece of good advice or a dull story.

At the accidental sight of people in grief or joy, though we are perfect strangers to them, know nothing of the cause of their emotion, and are not at that moment in the same circle with them; our features insensibly, as we look at them, assume the appearance of grief or joy, provided we have no particular reason to controul them.

I have seen one electric glance from Mrs. Siddons transfer horror into the faces of a whole audience, even of those who had just arrived, and were in no degree previously affected by the *cunning of the scene*.

Affections of the mind not only produce transient expressions of sympathy in the features of the countenance; but when they are excessive, or when the constitution of the person affected is weakly, they have been known to stop the springs of life altogether, or subject the constitution to some permanent disease.

The unexpected sight of an object of horror is one of the causes of epilepsy, and is said to be particularly apt to prove so, when the horror is raised by seeing a person under the convulsive contortions of this disease.

That all sympathies between different parts of the body are owing to the nerves, is in the highest degree probable; but how they are carried on, we have no clear idea; it is in vain to attempt to account for it by the communication of the nerves with each other,

or by any nervous communication between the sympathising organs; for each nervous filament is distinct from all the rest the whole way from its origin to its termination; and there is a striking sympathy between many parts, which have no communication by means of nerves with each other, as in the instance above mentioned of eunuchs.

Besides, when we do trace a communication by nerves between any organ and a part with which it sympathises, we cannot impute the sympathy to this communication; because we sometimes find that the same organ has an equal communication by nerves with some other parts with which it has no sympathy.

As it is evident, therefore, that various affections of the mind, excited by external objects, produce extraordinary motions, and other effects on the body, merely by affecting the brain; and as the consent and sympathy between different parts instantly cease, when their communication with the nerves is interrupted, it seems natural to conclude, that all sympathy takes place through the intervention of the brain.

What happens in the epilepsy or falling sickness, will contribute to illustrate and confirm this opinion. In the epilepsy the fit begins by the person's falling down in a state of complete insensibility, and immediately after, his whole muscular system is agitated with violent convulsions, the muscles of the face and eyes in particular being frightfully moved and distorted, the tongue is sometimes thrust between the teeth, and if care is not taken to guard against it, it will be bit through by the convulsive shutting of the jaws.

The cause of this disease is an affection of the brain of some kind or other. It may happen by the direct stimulus of an instrument, splinter, or other extraneous

traneous substance; by whatever impels the blood with violence, and in unusual quantity, to the brain; as a fit of anger, intoxication, violent exercise in a warm sun; it may also be occasioned, as has been already remarked, by a sudden fright, the unexpected sight of an object of horror; particularly that of a person under a fit of the same disease. In the cases above enumerated, the brain itself is directly and immediately attacked, whether the irritating cause be mental or corporeal; but the disease is also produced by stimulants, which act immediately and directly upon some distant part, and the impression is transferred to the brain by the nerves, as in the instances of the teething of infants, of worms, or something acrimonious in the alimentary canal, calculi* in the kidneys, and finally, by what is called the *aura epileptica*.

This is a sensation which some epileptics have, previous to every fit: Some describe it like a current of fresh air flowing slowly, others like an insect moving or creeping upwards from the extremities or lower parts of the body to the head, where it no sooner arrives than the patient becomes insensible, and falls into an epileptic fit.

But none of those irritating causes which begin by an attack elsewhere, and not upon the brain, are ever found to produce a pain, convulsive motion, or affection of any kind, in any of those parts with which they have a communication by the nerves; and may be supposed to have a sympathy, until the stimulus has, in the first place, been conveyed to the sensorium or brain.

This appears evident, because the patient becomes insensible in the first place, and the convulsions happen afterwards: Whereas if there was a sympathy between the different parts by means of the nerves

independent of the brain, we should certainly sometimes see convulsions in the stimulated parts themselves, and, in those with which they sympathise, previous to the brain's being affected.

The first sensation of the *aura epileptica* is generally felt at one particular point; sometimes a tumour or some other external mark of disorder indicates the place; but at other times we can perceive nothing of that nature, and so far from affecting any other part with which it may have a nervous communication by sympathy, we sometimes can only presume there is some disorder in that part, from the circumstance of the *aura*'s beginning there.

It seems very remarkable, that the disease may be radically cured by cutting out, or otherwise destroying the part; when this cannot be safely done, or is not submitted to, the fit may be prevented by a ligature applied above the part where the *aura* arises.

And when that dreadful disease, the tetanus or locked jaw, arises from the injuring a nerve by puncture or any external violence, although the disease should not appear for many days after the injury is received, and when the wound seems almost healed up; yet even then, the most effectual means of preventing impending death, is, by entirely amputating the part, or at least cutting through the nerves belonging to it, and so destroying its communication with the brain or spinal marrow.

But there is a power of a peculiar kind belonging to muscular fibres, by which they are enabled to move and contract themselves for some time, independent of the will, of their communication with the brain, and of life itself. For after the nerve which solely supplies a muscle, has been tied, entirely cut through, or otherwise destroyed, still the muscular fibres may be excited to contractions, by a sharp instrument, or the touch of some acrimonious substance.

substance. Even after the animal is dead, or when a muscular part is cut from the body, this contractile power continues for some time in the muscular fibres ; it remains much longer in some animals than in others, and in all animals is more apparent, and remains longer in the heart, than in any other part.

If the nerve going to a muscle be irritated, the muscle contracts, but not the nerve ; yet this irritability is not in proportion to sensibility ; for the heart, which is the most irritable part of the body, is far from being the most sensible. Muscles upon being irritated, generally contract and relax alternately several times ; the contractile force diminishing each time till it ceases entirely.

The phenomena of irritability are undisputed ; but physiologists are not agreed respecting the cause. The most prevalent opinion is, that this property is inherent in the muscular fibres, totally independent of the nerves, because it exists after the communication with the brain is cut off. But this does not appear to me a satisfactory proof ; because although it unquestionably does exist in the muscular fibres, after their communication with the brain is destroyed, yet it exists but for a short time ; the nerve still remains in the muscle, and it is very possible that the contractile power is entirely derived from the nervous influence received from the brain, before the communication was interrupted, and which continues to operate for some time after. We know that every part of the body is kept alive by means of the circulation of the blood ; but if the circulation is stopped for a few minutes in any particular member, that member will not immediately mortify. Animals will live a considerable time without fresh supplies of nourishment ; but we would

would not conclude from thence, that animals are not kept alive by food.

It ill accords with the beautiful simplicity of Nature, to make use of two causes, when one is sufficient to produce an effect. Since, therefore, it is evident, that muscles are empowered to move and contract by the means of nerves, and the communication with the brain, why impute this irritability to a new cause, when it is equally accounted for by supposing, that the nervous influence remains in the muscular fibres for some time after the communication is interrupted?

The sum then of our knowledge of the nervous system is, that the brain is the seat of thought, and origin of all sensation and motion; that every sensation is conveyed thither, every idea formed there, and the power of every motion proceeds from thence through the nerves to the muscular parts of the body.

We know that the will can produce motion in certain parts of the body, and not in others; that the nerves are the immediate instruments of feeling and motion; that all sensibility and motion, except that particular kind proceeding from irritation, depend upon the intercourse between the moving part and the brain, by the nerves being entire; that a general sympathy, by means of the nerves, prevails over the whole body; and that there is also a particular sympathy between particular parts.

But by what means, or in what manner those things are brought about, we have not the smallest conception. Physiologists have struggled hard to account for some of them; but in my mind they have left the matter much as they found it.

Some have supposed that the brain conveyed its influence along the nerves by vibration.

The Latin word *nervus*, which signifies both the finew of an animal, and the string of a musical instrument,

instrument, which excites sound by vibration, probably led to this idea ; for in other respects, nothing can be less analogous to a tense elastic musical chord, than loose nervous filaments, generally immersed in a cellular membrane, unelastic and incapable of tremulous motion.

Besides, the nerves convey sensation when they are relaxed, by bending the arm or leg, as well as when they are stretched by extending the limbs.

It has been maintained by others, that the brain is of the nature of a gland, and secretes from the purest part of the blood a refined fluid called animal spirits ; and that the nerves are excretory ducts, through which this fluid issues, at the command of the will, for all the purposes of life ; that this fluid is gradually exhausted by the labour of the body and mind, while we are awake, but during sleep a fresh supply is secreted for the occasions of our waking hours.

It is unfortunate for this hypothesis, that this refined fluid happens to be so very refined as to baffle the power of our sight, and of all the optical auxiliaries we can bring to its assistance. The cavities of the nerves, which are supposed to contain this fluid, labour under the same misfortune.

If the doctrine, however, were well supported in other respects, those objections might be gotten over, for in many instances we have a complete evidence of the existence of things not seen ; to mention only one, we can, by the help of microscopes, see, and but just see, certain animalcules ; and we are fully convinced that those animalcules are organized, and have vessels which we cannot see.

With regard to the animal spirits being exhausted by the labour of the mind and body, and fresh supplies accumulated during sleep, this may be thought liable to a stronger objection, in as much as

as we see so many people who sleep a great deal, and use neither bodily nor mental labour while awake, and yet seem not possessed of more animal spirits, or any other kind of spirits, than their neighbours.

It is certain, however, that the nervous powers are exhausted when awake, and restored during sleep ; but it is equally certain, that Nature requires only a competent share of sleep, as of food, to restore her exhausted powers, and more than that of either has a debilitating, not a strengthening effect.

Some physiologists, who seem in other particulars well enough satisfied with this system, hesitated when they reflected on the rapidity with which the will is obeyed by the moving muscles, which seems incompatible with the nature of any liquid ; and therefore they thought proper to convert the animal spirits into a kind of elastic vapour, secreted by the brain, which they imagined might move through the nerves with the facility and quickness of thought, and enable them to perform their duty in a more satisfactory manner.

Others dropping the idea of the brain's being an organ of secretion, or that the animal spirits are drawn at all out of the blood, inform us, that there is a certain *elastic æther*, of infinite subtility, which pervades all nature : That this æther, when it meets with glass, rosin, and some other substances, and is put in motion in a particular manner, produces all the phænomena of electricity ; united with iron, it is the cause of magnetism ; and being modified in the brain and nerves by an organization which we cannot conceive, becomes the agent of their powers.

The electrical sparks which issue from the bodies of certain animals on friction ; the salutary effects of electricity in sundry diseases, particularly in paralytic complaints, and such wherein the nerves are chiefly affected,

affected, are brought in support of this doctrine; which is supposed to receive additional force from certain late observations relative to the shock, like the electrical shock communicated by the touch of certain animals.

Soft pulpy substances, as the brain, spinal marrow, and inelastic cords like the nerves, seem however ill calculated for retaining or conveying such an active fluid as that of electricity; and if they had such a power, it would be still difficult to conceive that a compress or ligature upon a nerve could stop a fluid of such subtlety.

But if it were as easy a task to give a satisfactory explanation of this abstruse matter, as it is to start objections to every system hitherto suggested, the means by which the brain acquires its powers, and the manner in which it conveys its influence to the remote parts of the body, would have been explained long ago.

I have just hinted the different opinions that have been entertained on this subject. They are detailed at a tedious length by various authors, and insisted upon with more zeal than they seem to merit. For even admitting the truth of any of the above hypotheses, they could be applied to no practical use; none of them are founded on experiment, and all of them fail in throwing any light on the subject which it is pretended they explain. The ridicule thrown by the supporter of any one of those conjectures upon all the others, may with equal strength be retorted on his own; for it is as difficult to understand how secreted fluids or elastic æther can convey the sense of smelling, &c. as that solid cords should do it. And whether the nerves are solid cords operated on by vibration, or hollow tubes containing a secreted liquid, or substances which attract a subtle æther, of the nature of the electric fluid, still we should be in the dark how the will commands

commands various movements of the body ; how having the command of some parts, it has not that of others, which are equally supplied with nerves ; how certain parts are capable of sensation *only* when they are in a morbid state ; how nerves, apparently of the same structure and nature, convey such different sensations. The sound of musical instruments affects not in the smallest degree the optic nerves, while it delights the auditory ; and the effluvia of a rose, so agreeable to the olfactory nerves, gives no kind of sensation to the two former.

We know in general, that certain passions of the mind produce particular effects on the body ; but by what means they produce them, nobody has as yet been able to explain. And that passions, the most opposite and dissimilar, should in some instances produce the same effect, seems equally unaccountable. Who could expect, for example, the same redness of the face from the delicacy of modesty, that is produced by the violence of rage ?

That the palpitation of the heart, and paleness of the face, occasioned by fear, immediately proceed from a contraction of the vessels, and from the blood being thereby stopped in its course, and thrown back on the heart, we naturally conjecture ; but how that passion does produce the contraction, we cannot comprehend.

And all the theories hitherto invented, leave us equally ignorant how to account for or remedy a disease, said to be more frequent in this island than elsewhere ; and which certainly depends on some affection of the origin of all the nerves, although from certain symptoms, with which it is sometimes accompanied, it derives its name from another part of the body *.

In

* Hypochondriasis, a disease so called from its seat being supposed to be in a part of the belly which physicians call the hypochondriac region.

In this melancholy complaint, the patient, when apparently in good health, and perhaps in the most opulent and desirable circumstances, is gradually invaded by a languor and dejection of spirits, which render him averse to every kind of exertion of body or mind, regardless of things of the greatest importance, and which formerly interested him the most.—But he becomes infinitely attentive to a thousand trifles which he used to disregard, and is particularly watchful of every bodily feeling, the most transient of which he often considers as the harbinger of disease ; and viewing objects through the medium which overclouds his own imagination, every thing appears to him dark and dismal. He is always apprehensive of the worst ; and considers the most indifferent and even the most fortunate incident as the omen of some impending evil. Although in his brighter days he may have been a man of courage, he becomes preposterously afraid of death, now when he seems to have lost all relish for the enjoyments of life.

Entirely occupied by his own uneasy thoughts and feelings, all other subjects of conversation appear impertinent, and are in reality as intolerable to him as the everlasting theme of his own complaints generally is to others : Mean while, as this disease is in reality more distressing than dangerous, and as his looks are not impaired in a degree that corresponds with the account he gives of his distress, he seldom meets with that sympathy which his sensibility requires, and his sufferings deserve. To a circumstantial and pathetic history of his complaints, he often receives a careless, and, to him, a cruel answer, importing that they are all imaginary. One who feels a weight of misery more burthensome than acute bodily pain, naturally considers this as the greatest insult. Shocked at the unkind indifference of friends, and the callous disposition of mankind in general, he shuns his former

former society, confines himself to his chamber, and will admit nobody but his physicians ; for if he can at all afford it, he consults, one after another, the whole tribe. Being bribed to that patient hearing of his complaints, and that appearance of sympathy which the rest of his acquaintance refuse, they seem more tolerable company, and they possibly relieve or palliate the costiveness, the flatulency, the acidities, and other symptoms which are brought on by the anxiety attendant on this complaint ; but the original cause affecting the sensorium they leave as they found it. This cause continuing in spite of all their bitters, and their stomachics, and their purgatives, and analeptics, the same symptoms constantly recur. The wretched patient growing every hour more irritable and peevish, he flies at length to quacks. Their well-attested and infallible remedies hurry on the bad symptoms with double rapidity ; he returns to physicians, goes back to quacks, and occasionally tries the family nostrums of many an old lady. His constitution being worn by fretfulness and by drugs, he at length despairs of relief, and either sinks into a fixed melancholy, or roused by indignation, his good genius having whispered in his ear, *fuge medicos et medicamina*, he abandons the seat of his disappointments, tries to dissipate his misery by new objects and a different climate, consults no practitioners of any country, sex, or denomination ; and forms a fixed resolution to swallow no more drugs, from which happy epoch, if the case be not quite desperate, he has the best chance of dating his recovery.

The disease now described, though accompanied with some of the same symptoms, is to be distinguished from a direct affection of the stomach and bowels, impeding the process of digestion, and occasioning want of appetite, heart-burn, acidities, flatulency, costiveness, and at length, if the causes of these complaints

plaints are not removed, dejection and other nervous symptoms.

It is also different from what is called the hysterical disease in women, which, besides the symptoms above enumerated, is peculiarly accompanied with a pain in the left side of the belly, with the sensation of a ball rising from the stomach to the throat, and threatening suffocation, with alternate fits of laughing and crying, with fainting and spasms.

What most essentially distinguishes the hypochondriasis from those two disorders is, that the former gradually overspreads the mind in the first instance, and often without any known cause of grief and vexation? The other symptoms are secondary, occasional, and produced by the long continued influence of the former; whereas indigestion and the hysterical disease do not necessarily originate in any affection of the mind, the first proceeding from a weakness of the muscular fibres of the stomach, too great delicacy in its nerves, or some fault in its digestive fluid; and the various and extraordinary symptoms of the second originating in peculiar affections of the uterus, irregularities in the menstrual periods, and great sensibility.

In a word, in the hypochondriasis the mental affection or dejection of spirits is primary, and the other symptoms secondary. In the other two complaints, the alimentary canal, or the uterus, are disordered in the first place, and the mental affections are secondary *.

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Another

* As women are sometimes thrown into hysterical fits by being contradicted, by a sudden fright, or some violent emotion of mind, those instances may be thought inconsistent with this opinion. I will say nothing of the fits which seem to be owing to contradiction; but as to the others, when we recollect that it is only during those years of life in which menstruation exists, that women are subject to hysterical fits; that they are most liable to come while the period is actually on them; that obstructions, independ-

Another important distinction between these two disorders and the hypochondriasis is, that the former may be diminished, and in many instances entirely removed, by the judicious application of bracing, deobstruent, carminative, and sedative medicines; whereas the chief assistance we can give in the latter must be derived from other sources.

I shall here terminate the proposed view of certain parts of the animal œconomy. Cursory and incomplete as this may be deemed, it is sufficient to shew the folly and presumption of those who pretend that it is in their power to remedy every disorder in a system whose essential functions are imperfectly understood; it shews at the same time that so far from being surprising that the art of medicine is unequal to the task of curing every disease to which the human constitution is exposed, it is rather wonderful that it can give so much relief as in certain cases it actually does.

In no other art can the artist contribute to the rectifying a disordered machine of whose structure he has an imperfect knowledge, and some of whose principal springs he is excluded, by insurmountable obstacles, from examining.

That the physician has this in his power, depends indeed upon a circumstance in the animal constitution which no production of human art can boast—the constant tendency, so often mentioned, in diseased nature to restore itself.

If the productions of art possessed the same advantage; if, when the movements of a machine were by any accident impeded, it had within itself the power of throwing out the obstructing cause; or when a spring

dent of any other cause, occasion them; that unmarried women are more subject to them than those who are married, and the barren than those who have children; we must think that hysterical complaints depend on some affection of the uterus or ovaria.

spring chanced to break, if it could solder and heal spontaneously, we might then see men rise to eminence in the mechanical employments, without understanding the common principles of their art.

When a watch went irregularly, we should see men totally ignorant of its mechanism undertake to put it to rights with all the easy confidence imaginable. They would perhaps gravely open the case, look with becoming sagacity through a glass at the wheels, assume an air of profound reflection, give it a random shake, and then assure the owner that all would be well in a short time. If after this, by its own energy, it happened to recover its movements, the artist would of course have the credit ; but if unfortunately it did not, he would then shake it again, according to a new method ; and if that failed, give it over as desperate.

But as neither watches nor any other of the works of art are endowed with the faculty of reintegration, the artist, before he undertakes to mend them when out of order, is under the indispensable necessity of understanding their structure, and the laws by which they act.

And notwithstanding that some succeed without it, yet upon the whole, those who apply to the art of medicine had best follow the same plan, and study the animal œconomy and the nature of diseases with as much assiduity as if, like the watchmaker, they had nothing but their knowledge to depend upon. But whatever their acquired knowledge may be, they must always remember that Nature is the greatest of all physicians, and that their chief business is to watch with all possible attention which way her salutary efforts point, that they may, by every means which their knowledge of the animal structure and œconomy, and their own experience, or that of others, has taught them, assist Nature in those efforts.

M E D I C A L S K E T C H E S.

PART THE SECOND.

I.

OF FEVERS IN GENERAL.

I NOW proceed to offer a few remarks on certain diseases. I begin with fevers, because the disorders which have been arranged under that denomination are the most common and universal of any to which the human body is liable.

When the circulation of the blood is quicker, and the body is hotter than is natural, there exists a certain degree of fever.

The most part of diseases are attended with an uncommon quickness of the pulse, and heat; a greater or lesser degree of fever therefore is a symptom of most diseases.

What is commonly understood by the term *fever*, however, is a complaint beginning with a shivering, or at least a sensation of cold, soon followed by a quick pulse, universal heat, and disorder of the natural functions, but not originating from a wound,

or the direct affection of any particular part of the body.

When an affection of any part in particular, whether from an internal cause or an external injury, is the primary and essential complaint, the fever which accompanies this is considered as a symptom only, and the disease is not denominated a fever; but when the cause of such a local affection is internal, the disease derives its name from the organ affected; and if it proceeds from an external injury, it is simply called a wound or bruise.

Thus an inflammation of the membrane that lines the interior surface of the thorax (the pleura) is called a pleurisy, an inflammation of the kidneys a nephritis, of the liver hepatitis, and so on.

As fevers arise from different causes, affect people of different constitutions, vary in different climates and seasons, they must of course be different in their nature, and require a different treatment.

Notwithstanding those differences, there are certain symptoms and circumstances common to all, which unite them under the general name of fevers.

The essential symptoms common to all fevers at their first attack are, languor, weariness, and soreness of the flesh and bones, followed by a sense of cold, which beginning in the back gradually creeps over the whole body. This coldness, in some, is attended with gentle irregular shudderings, in others with a strong fit of shivering, with paleness of the skin and lips, dryness of the mouth, a want of appetite, an inability to sleep, impaired sensibility, and often some degree of confusion of thought. The coldness is succeeded by an uncommon heat over the whole body, and the dryness in the mouth, by great thirst. At last a sweat, more or less profuse, breaks forth, and the body becomes in some degree cooler, or perhaps returns entirely to its natural state.

Division of Fevers.

If the disease concludes within the space of twenty-four hours, it is called by physicians an ephemera, or a fever of one day.

If the same symptoms regularly return and go off at the stated intervals of one or two days, the disease is an ague, or intermittent fever.

If, with little or no evident abatement, the disease proceeds with equal or increasing violence, it is then called a continued fever.

The term is not strictly accurate; for there is reason to believe that all fevers, except ephemera, are attended with diurnal exacerbations and remissions. As those, however, are very different from the intervals above mentioned, often escape the notice of the careless, and sometimes are distinguished with difficulty by the most attentive observers; fevers are with propriety divided into two classes, the continued and the intermittent.

The latter are readily distinguished from the former by the total absence of fever during their intervals; and they are distinguished from each other by the names quotidian, tertian, and quartan, according to the duration of those intervals.

Division of continued Fevers.

Continued fevers have been divided and subdivided by various authors with such a parade of learning, and such an affectation of precision, as terrifies the diffident student, and perplexes the most experienced practitioner.

Who would not be alarmed, on being informed that such a formidable band, such a febrium cohors as the following, had invaded the earth—febris inflammatoria, scorbutica, soporosa, putrida, nervosa, typhus petechialis, flava, sudatoria, colliquitiva, ardens, hectica, cephalalgica, bilosa, erysipelacea, synocha,

synochus, paludosa, verminosa, maligna, &c. &c., &c. And after being thus informed, who could be surprized to find that death walked with a hastened step through the land*? To lay hold of the occasional symptoms which arise from the differences of constitution and other circumstances, and erect them into new diseases with terrifying names, burthenes the memory, and tends to darken rather than elucidate.

He who breaks a loadstone into a great number of pieces, will throw as little light upon the nature of magnetism, and discover as little of its cause, as if he had left the loadstone entire.

To give terms instead of ideas, is a practice not confined to physicians: From long established custom, however, such counters seem to pass more currently, and are oftener received in exchange for gold, from them than from others.

Those who are solicitous to be thought profound, do not always wish to be intelligible; they gain their purpose more effectually without it. My chief aim, on the present occasion, is to be useful. I must therefore endeavour in the first place to be fully understood.

I do not pretend, by any new system, to explain what writers of far greater genius have left in obscurity; but perhaps by giving some of their ideas in a plainer and simpler dress, and adding such of my own as experience and reflection have confirmed, will be of service.

Two very different states of the human body are supposed to accompany the diseases comprehend-ed

* ——Nova Februm

Terris incubuit cohors:

Semotique prius tarda necessitas
Lethi, corripuit gradum. HOR. lib. i. carm. 3.

ed under the name of fevers, and to form their great and fundamental distinction.

One is called the phlogistic diathesis, or inflammatory disposition ; by which the heart is excited to rapid and strenuous exertions, during the continuation of which there appears great strength in the action of the vessels, and the blood itself seems to be of a firmer and denser texture than usual.

In the other, the brain and nervous system are more directly affected, their energy seems impaired, the force of the heart and vessels is diminished, the blood is of a looser texture, and in a more dissolved state, and the animal juices tend, as some have imagined, to putrefaction.

In the first state, when the inflammation originates from external causes, as wounds, contusions, or burns, the fever follows the local affection, and is in proportion to the degree of inflammation, and to the importance of the part or organ affected.

This is also the case in certain disorders of the lungs, liver, and other viscera, which arise not from external injuries, but from some vice in the part, which gradually brings on inflammation, and the inflammation fever.

If the local inflammation is removed, the fever is removed also ; if it cannot be removed, but increases, gradually destroying the organization of the part, the patient dies sometimes by the violence of the fever, and sometimes merely because an organ necessary to life is destroyed.

In all these cases, therefore, the disease is not a fever, but a local inflammation producing feverish symptoms.

These symptoms are shiverings, a strong, hard, and full pulse, heat, thirst, restlessness ; and if any blood is drawn, a thick gluey substance of a buff colour will be soon formed on its surface.

But

But it often happens that people are seized with shivering, and all these symptoms in a strong degree, without any external violence, or the affection of any particular organ.

In this case the symptoms being the same with what occur in local and visible inflammations, the whole mass of blood is supposed to be affected in the same manner as when they evidently exist, and this disease is naturally enough called an inflammatory fever.

The other species of fever, when pure, displays symptoms very different, and in some respects opposite to this inflammatory irritation.

Weak and quick pulse, debility, and prostration of strength, heaviness and dejection of spirits, as if the vital principle were invaded by some baleful influence acting directly on the nervous system;—those and other symptoms have procured this fever the name of nervous.

When the same symptoms attack with a greater degree of violence, it has been called malignant; and as dusky brown, violet, or black spots, and vibices or blue marks like bruises, imputed to a putrid state of the fever, sometimes appear, it is also called the putrid fever.

Those and various other circumstances, however, seem to form no essential distinction. The whole may be comprehended under one name; and provided the symptoms which discriminate this from the inflammatory fever be accurately described, it is of no importance which is chosen.

If fevers always were found in Nature as pure, unmixed and distinct, as they are described in authors, the labour of those who apply their minds to the study of medicine might be greatly abridged.

Ask a very young student of physic what is to be done in an inflammatory fever, and he will answer,

swer, without hesitation, that you must bleed and dilute.

Ask again what is to be done in a nervous, malignant, or putrid fever, and he will answer with equal readiness, you must give the bark, &c.

Carry him to the bed-side of a patient with a pretty strong and hard pulse, considerable heat and dryness of the skin; here, he will say, is a vigorous motion at the center of the vascular system, with great contraction, and strong resistance by the vessels at the circumference; to allay the internal commotion, and relax the spasm, plentiful venesection must be used, and great quantities of cooling bland diluting liquors must be drank; but on farther examination, he finds uneasiness in the head, nausea, dejection, and impaired sensation and debility, symptoms indicating a dire&t nervous affection, and for which, had he found them unaccompanied by the former, he would have prescribed corroborants, cordials, and antiseptics; but finding them thus combined together, he does not know whether to call the disease inflammatory or nervous, and of course is at a loss what to prescribe.

In reality, it requires much experience, sagacity, and attention, to decide what course ought to be followed in those complicated cases, where the two genera are so intimately blended, as often happens in the continued fevers of this island.

The Causes of Fevers.

It is usual for writers to enumerate what they consider as the causes of fevers; these they divide into two classes, the remote and the proximate.

Under the first head, some have favoured the public with a list of almost every thing that can disorder the human body.

Full diet, thin watery diet, hot diet, too great exercise, too little exercise, drinking cold watery liquors when the body is hot, warm liquors when the body is cold, and spirituous liquors whether the body is hot or cold ; plethora, hemorrhages, stopping of issues and other evacuations, the retention of excrementitious or other offensive matter in the stomach and bowels, cold dry winds, moist weather, hot weather, change of climate, night-watching, intense thought, venery, fear, grief, anxiety, the miasmata, or certain particles floating in the air, and which arise from marshy grounds acted upon by heat, and the effluvia which constantly flows from living human bodies pent up or confined from being diffused in the atmosphere.

What produces many mistakes and difference of opinion respecting the causes of diseases, is, that we know little or nothing of the relation between cause and effect, but merely that we see the one follows the other.

When a philosopher holds any thing in his hand, a leaden bullet for example, he knows it will fall to the ground on his spreading his fingers ; the most ignorant peasant knows the same, and for the same reason, because he has seen it always happen so.

The difference between the philosopher and peasant is, that the former will endeavour to find out why it always happens so ; whereas the latter will be fully convinced he knows it already, and that he could have foretold that lead, and every heavy substance, must necessarily fall to the ground, although he never had seen or heard of such a thing in his life : Nothing can be clearer, he would say, than that a bullet must fall to the ground, when it is not supported.

Yet it is evident that it might have been as natural, for aught he or the greatest philosopher alive knew

knew before trial, for the bullet or any other substance to have mounted upwards, have taken an horizontal direction, or remained self-suspended in the air.

And although the philosopher should never be able to discover any other relation between two events, but that the one always follows the other, he will agree with the peasant in calling the first the cause of the second, and all the world will follow their example.

If we see the events happen in this succession in a great number of instances, although the second should happen without being preceded by the first in a few, still we will suspect the first for its cause, notwithstanding that something or other, we do not know what, prevents its appearance in some cases; this however raises doubts; we are not quite so certain as we were.

But fevers are not always and regularly preceded by the same events, but sometimes by one, sometimes by another, and sometimes by a number together; in such cases, therefore, we need not be surprized that there are frequent mistakes, and a variety of opinions, respecting their causes.

Indeed, if the catalogue of causes above enumerated is admitted, we never can be at a loss for a cause for a fever or any other disease, for few events of our lives are not preceded by some of that list.

But it is evident that the greatest number of them have at most only a tendency to predispose the body in such a manner, that some succeeding cause, which of itself might not have been sufficient to induce a fever, may have that effect; or if the succeeding cause would have been sufficient to produce a fever, the predisposing causes above enumerated may render the disease more obstinate and dangerous.

I shall examine only a few of those remote causes, under

under which the greater part of the others may be naturally enough included.

I begin with cold.

Sydenham says, *Causa evidens externa febrium quamplurimarum inde petenda est, quod quis scilicet vel præmaturius vestes abjecerit, vel exercitatio incalescens se frigori incautius exposuerit*; and a little after he adds, *Et sane existimo plures modo jam designato, quam Peste, Gladio, atque Fame, simul omnibus perire.*

This last seems a very strong expression, but is probably applied to all who die in consequence of obstructed perspiration.—Whether the disorder it produces be what is properly called a fever, or a peripneumony, an hepatitis, or any other disease; in this sense, and in this island, unquestionably more people are destroyed by the causes mentioned by Sydenham, than by the plague, sword, and famine.

Exposing the body for any length of time to a greater degree of cold than it has been accustomed to, is evidently the source of a very great number of diseases.

The immediate effect of this is a contraction of the pores on the surface of the body, by which means the fluid particles which usually pass this way are retained, and thrown back into the general mass, which when long continued is found greatly to disturb the animal functions.

Knowing that stoppage of perspiration sometimes produces dangerous diseases; it is natural to be surprised that diseases are not still more frequent; that they do not happen in consequence of every change from a warm climate to a cold, or of every change from warm to cold weather, or of remaining for any time in a colder room than we are accustomed to; or, in short, of all those stoppages or diminutions of perspiration which must happen to the most wary.

This

This would inevitably be the case, if Nature did not contrive to prevent it, by investing the different organs of secretion with the power of mutually assisting each other ; a deficiency in one being generally compensated by the augmentation of some other.

The agreeable vicissitude by which an intermediate season is always placed, between the heat of summer and the cold of winter, is another means by which Nature guards against the diseases to which the human body would be liable, if it were not thus gradually prepared for the succeeding extreme by a moderate intervening season.

But the admirable arrangement by which each season is blended with that which precedes it, and then by degrees assumes the nature of that which is to follow, although it certainly prevents in a great measure the destructive effects which a sudden change from summer to winter, and from winter to summer, would have on the human constitution, does not *entirely* hinder the successive seasons from producing changes in our bodies which dispose them to particular diseases, as is evident from the nature of the epidemics peculiar to the different seasons, which are more regular in many other countries than in the variable and uncertain climate of Great-Britain.

Cold is found, by universal experience, to give a disposition to inflammatory disorders, and heat to those of that nature which has been called putrid. During the winter, and early in the spring, pleurisies, peripneumonies, inflammatory anginas, rheumatism\$, and inflammatory fevers, prevail. Towards the end of summer, and particularly in autumn, fevers of a different nature, dysenteries, and putrid ulcerous sore throats, make their appearance.

If the former are more frequent in the spring than during the winter, this is imputed to the cold being more steady in winter ; whereas in spring many people

people are tempted, by the heat of mid-day, to throw off part of their clothes, and contract diseases from the unexpected chills of the same evening.

That autumn is more unwholesome than summer is thought to be owing to this, that the human body, after being relaxed by the long heats, and enervated by the profuse perspiration of the summer, is then more affected by the cold of autumn; and likewise, because the air then abounds with the exhalations of putrid animal and vegetable substances, which are thought to have a morbid effect on the human body.

Of late it has been doubted by some physicians of great eminence, whether cold alone, without the concurrence of other causes, particularly marsh or human effluvia, can produce fever.

But when a person, upon throwing off part of his clothes, or on remaining in a cold or moist place for an unusual length of time, is immediately seized with a fever, in my opinion it is highly reasonable to think the cold, to which he has been unaccustomed, is the cause, and not those effluvia or miasmata, call them what you please, which for aught we know he has been inspiring and absorbing, in as great quantities at other times, as when he fell into the fever.

It may be said indeed that there is no proof that those miasmata have not had a great effect at this particular time, although they had none before. But if a person fell down senseless, in consequence of a violent blow on the head with a bludgeon, it might also be said that the blow would not have had such an effect without the concurrence of an apoplexy which the person was seized with, at the instant he received the blow: And whoever asserted this, might rest secure that there could be no absolute proof to the contrary.

All that can be said is, that when we see people seized with inflammatory fevers, after their bodies have

have been exposed to the impression of a sharper cold than usual, and for an unusual time, we have the same reason to believe that cold is the cause of the fever, that we have for believing that any cause produces any effect.

Although it is true in general, that cold occasions a disposition to diseases of an inflammatory, and heat to those supposed to be of a putrescent nature, yet those who are constrained by necessity or by duty to take violent exercise in sultry weather, and those who accidentally fall asleep on the ground exposed to the beams of a mid-day sun, are sometimes seized with fevers of a highly inflammatory and dangerous nature ; the inflammation directly affecting the brain itself, or its membranes.

It would seem that heat gradually and uniformly applied has a constant tendency to relax and debilitate the human constitution ; for we find in general that the inhabitants of hot climates are more effeminate and less capable of great exertions than those of the moderate and of the colder ; and we also find that the common diseases of the warm climates are of a nature the reverse of inflammatory. Yet sudden and excessive heat from severe exercise in a hot day occasions the most violent inflammatory fevers, as too much heat partially applied occasions the most violent local inflammations. But where no such excesses have been suddenly used; only the heat of summer allowed to act gradually on the body, there can be no doubt that it tends to remove from the constitution the inflammatory disposition produced by the cold of the preceding seasons; and disposes to diseases of a contrary nature; attended very often with disorder in the stomach and bowels, and the appearance of a redundancy, or acrimonious state of the bile.

Towards the end of August, particularly after sultry weather followed by rain, the disease called cholera, or a vomiting and purging of bilous matter, at-

tended with severe gripings in the intestines, often prevails in this island.

There is every reason to believe that this disease flows from the heat of the weather producing an increased secretion of bile, and at the same time rendering this liquor so acrimonious as to produce painful irritation of the stomach and bowels. That this is the cause is the more probable, as the best method of removing the complaint is by throwing great quantities of mild diluting liquors into the body, which at once favour the evacuation of the redundant bile, blunt its acrimony, and sheath it from irritating the alimentary canal.

About the same period, and proceeding from the same causes, the excessive heats of summer, followed by the moisture of autumn, dysenteries, and the fever called bilious, appear—a name first given to it on account of the bilious vomitings and purgings, the yellow colour of the skin, and other symptoms of a redundancy of bile which attend it.

A disposition in the bile to pass off in great quantities by its sécrétaries, is observable in all warm climates as well as in warm seasons. Those who go from a cold to a hot climate, therefore, are generally soon after attacked with bilious fevers. There are strong reasons to believe, however, that this unusual quantity of bile is to be reckoned among the effects and not among the causes of this fever, which in Great-Britain is often of the mixed kind, generally beginning with inflammatory symptoms, and ending with those of debility and supposed putrefaction; the increased secretion and acrimony of the bile aggravating the other symptoms of the fever.

In what degree it leans to the one or the other, in some measure seems to depend on the state of the weather during the course of the disease, and the particular constitution of the patient.; the robust and sanguine

guine shewing a stronger tendency to the former, and the weakly to the latter.

Intoxication is reckoned among the causes of fever.

The general bad effects of this upon the human constitution are too obvious to be insisted on.

Wherever a predisposition to any particular disease lurks in the constitution, intemperance in drinking seldom fails to rouse it into action.

Repeated excesses of this kind sometimes produce the epilepsy in those never before subject to it; and always hasten the returns, and augment the violence of the fits in those who are.

I have known a single instance of intemperance bring this dreadful disorder back with violence, upon those who by former moderation had warded it off for years.

To increase good-humour, gaiety, and wit, and prolong the pleasure of conversation, is the usual apology for such excesses. But if it were a general rule to leave the company as soon as our taste and talents for sensible or witty conversation began to diminish, few would injure their constitutions by drinking.

There are indeed examples of people who support long and repeated excesses without much apparent injury.

There are also instances of people who have swallowed poison with impunity. But let those who are acquainted with such tough and well-seasoned veterans recal to memory the numbers of their companions, who, yielding to importunity, have fallen victims to this easiness of temper, and they will not be much encouraged by the example.

The daily practice of drinking to intoxication must be considered as improper, if there were no other argument against it than its depriving us of the advantage of an admirable and efficacious remedy in many

disorders, as is well observed by the celebrated commentator on Boerhaave's aphorisms: "Illa autem acrimonia, quæ fermentatis liquidis inest, miro stimulo atque efficacissimo auctam cordis velocitatem efficere potest; unde in morbis languidis et frigidis vini et cerevisiae generosioris moderatus usus adeo prodest. Immodicò horum usu febres, crapulares dictas, extintari, nimis notum est; verum levia hæc sunt, solentque ab illis, quibus soleat est hesterna venas habere inflatas Iaccho, contemni *."

For although intoxication never fails when first indulged to produce most of the symptoms which attend fever, as heat, drowth, head-ach, and nausea, it must be confessed that these wear away by habit; so that those who indulge every day in the bottle, if they survive the excesses of their youth, and escape consumptions, dropsies, and paralytic complaints in more advanced life, are in little danger of being cut off suddenly by a fever from drinking; they will have the comfort of outliving not only their friends, but very probably their own understandings.

Those who are not habituated to intemperance, are often thrown into violent fevers by that degree of excess, which is barely sufficient to put a person of the above description into tolerable good humour, and dispose him to a comfortable night's rest.

In some instances where people have fallen down insensible by extraordinary excess in drinking, a supervening fever has been considered as the only thing that saved them from a fatal apoplexy; as is remarked also by Van Swieten, who having quoted the following maxim from Hippocrates, "Si quis ebrius de repente obmutescat, convulsus moritur, nisi eum febris corrumpuerit, aut qua hora crapula solvitur, vocem edat," adds farther, "sed in Commentariis 558, ex Hippocrate notatum fuit summam ebrietatem sequi obmutescientiam,

* Gerardi Van Swieten Comment. tom. secund. p. 31.

“ obmutescentiam, et lethalem quandoque apoplexi-
“ am, nisi febris orta remedia fuerit ;” and then quotes
from the third book of Hippocrates’ Epidemics the in-
stances of two persons who “ ex potibus ambo pericu-
“ losa febre decubuerunt ; quorum primus secundo
“ jam morbi die surdus factus fuit, dein ferociter deli-
“ ravit, quarto die convulsus, quinto die periit. Al-
“ ter vero post difficilem morbum, vigesimo die
“ evasit.”

What appears certain from these quotations, is the great danger of excessive intoxication ; that in some cases it instantly kills, in others produces a violent fever, of which some die, and others with difficulty recover ; and that, in the opinion of Hippocrates and Van Swieten, the fever was the means Nature used to bring about the recovery. Some people will have the presumption to dispute the last article ; but admitting it, still it must be allowed that a disease must be of a very desperate nature for which a fever is the only remedy, and this remedy not always effectual ; for it sometimes happens, particularly to young persons of a sanguine habit, that in consequence of great excess in drinking, a fever of such violence is raised, that the patient dies after a few days of high delirium.

Violent passions of the mind, particularly those of *rage, fear, and grief*, are reckoned among the remote causes of fever.

There are doubtless instances of rage, when kindled to an excessive height, producing an apoplexy : The same passion in a smaller degree, or in a different constitution, it is said, may produce a fever : I certainly shall not deny that it may, but I never knew an instance of it.

A sudden fright is a very frequent cause of epilepsy, particularly in young people and children.

Fear instantly checks perspiration, disturbs all the secretions, and the natural course of the animal œconomy.

Grief has the same effects in a smaller degree ; but the passion is generally of longer duration ; both impair the appetite, retard digestion, diminish the energy of the brain, and the action of the heart ; and dispose the body so very much to the disease, that in this situation we frequently see a nervous fever arise, for which we can perceive no other cause.

Long continued costiveness, and the retention of excrementitious or other offensive matter in the stomach and bowels, is also classed among the causes of fever.

It is evidently the cause of loss of appetite, nausea, flatulencies, feverish heats, and much general oppression ; but I have never seen a formed fever, in adults, that I impute to this cause alone.

When a fever takes place indeed, from whatever cause, costiveness generally follows, and unquestionably has a tendency to augment all the symptoms.

I said I had never seen what could with propriety be called a fever, which originated in this cause alone in adults. I confined my expression to those of that class, because I do think this cause, independent of any other that we can perceive, does produce fever in children, not only by stimulating the nerves of the intestines in the same manner that worms do, but also by part of the acrimonious matter being absorbed and thrown into the mass of blood by the lacteals.

It will be said, that grown people are exposed to those causes as well as children : They are so ; but they seem not to have the same effect on the firmer and less irritable constitutions of the one, than they have on the other.

If this reason is not thought sufficient, another may be adopted. The fact remains unmoved.

In such cases, no doubt, the first thing that is to be done, is to cleanse the whole alimentary canal by proper purgations; but although this prevents more fuel from being added, it cannot at once extinguish the flame already kindled; the fever continues for some time, and requires a particular treatment.

For the removal of a cause does not always remove the effects, which sometimes become the causes of new and obstinate symptoms.

Excess in venery is also reckoned among the remote causes of fever.

The general effects of such imprudence are languor, weakness and dejection; and that this predisposes or renders people more liable to be infected by the other direct causes of the nervous fever than they would otherwise have been, is most certain; and some people think excesses of this nature of themselves may produce a nervous fever without any other cause.

The sentiments expressed by Celsus on this subject seem highly rational: “Concubitus vero neque nimis concupiscendus, neque nimis pertimiscendus est. Rarus corpus excitat, frequens solvit. Cum autem frequens, non numero sit, sed natura, ratione etatis et corporis; scire licet, cum non inutilem esse, quem corporis neque languor, neque dolor, sequitur.”—CELSUS, lib. i. cap. 1.

But fevers are often epidemic, and numbers of persons affected, on whom none of the causes above enumerated can be supposed to have operated, or cannot be supposed to have more force at the period when the epidemic prevails than at any other time.

They must therefore, in many instances, proceed from some other cause.

Certain noxious particles floating in the atmosphere, and more prevalent, or more powerful, at particular seasons, and in particular places, than in others, are accordingly considered as by far the most general

causes of fevers. Those miasmata are supposed to be the effluvia of stagnating corrupted water, and putrified vegetable and animal substances.

They are too minute to undergo the examination of our senses, yet we can have little doubt of their existence, and still less of their being the chief cause of intermittent fevers; and combined with cold, the frequent cause of the continued fever to which so many different names have been given; as bilious, remittent, &c.

The following considerations make this amount to a certainty.

Intermitting and remitting fevers abound in every climate, in the neighbourhood of moist marshy soils; in woody countries, where the air is confined by the number of trees; in low flat countries, where there is a great quantity of stagnating water, and no hills to direct a brisk ventilation.

The inhabitants of the mountains and of the valleys, where there are running waters, a dry soil, and strong ventilation, are not subject at all to agues, and very seldom to the bilious fever, while they remain in their own country; but in general are liable to be seized with one or other, when they come to the fenny countries.

Even in those countries the richer ranks of inhabitants who have dry apartments above ground, are less liable than the poorer sort, who are obliged to continue longer in the fields, exposed to the baneful influence of the marsh miasmata, and sleep on ground floors.

Of the poorest sort, the inhabitants of the towns and larger villages, where the noxious quality of the atmosphere is corrected by numerous fires, and ventilation is produced by the arrangement of the houses into streets, are less subject to the disorders in question than those who live in detached cottages.

The bilious remitting fever very seldom originates on board a ship ; but it is often carried on board by seamen or soldiers who have caught it when on the watering duty, cutting fuel, or any other service which required their being on shore. There are instances of seamen's having been put on shore on account of the scurvy ; and although the fresh vegetables they then obtained soon cured them of that disease, yet if the country on which they landed was marshy, and in the neighbourhood of woods, it has been observed, that they soon afterwards were seized with bilious remitting fevers *.

The season in which fevers are most prevalent, is the end of summer and beginning of autumn, when heat and moisture combine to hasten the corruption of animal and vegetable substances, and fill the atmosphere with an unusual quantity of miasmata.

Those considerations render it next to a certainty, that something essentially connected with a marshy soil produces fever ; and we can suppose nothing with so much probability as the effluvia of stagnating water, and corrupting vegetable and animal substances.

And if a sudden stoppage of perspiration, from the cold of autumn, after the body is relaxed by the preceding heat of summer, is sufficient of itself to produce fever in dry and well ventilated countries, where there is no reason to think that marsh miasmata prevail, we cannot be surprized to find them far more universal, and more obstinate, in low and marshy soils, where the first cause concurs with the second.

But

* Vide Medical Observations and Enquiries, by a Society of Physicians, vol. iv, article 12.

We are there informed, that in one ship the officers who never had the scurvy, on sleeping ashore one night, were seized with this bilious fever ; so were the carpenters and boat's crew, who were necessarily ashore : All who remained on board continued free from it.

But there is another cause more active than either, or than all the others taken together, in producing fevers of peculiar danger and malignity ;—the effluvia constantly flowing from the living human body, which when long confined in the same place, and prevented from expanding in the atmosphere, becomes in the highest degree acrimonious, and the cause of fevers equally contagious and malignant.

Wherever numbers of people are crowded together in close places, the air of which must soon be deprived of part of its vital power, by repeated respiration, this infectious matter will be formed ; but with most rapidity in gaols, in the holds of ships, and in hospitals, where its virulent tendency is hastened by nastiness, by unwholesome food, by desponding thoughts, or by the effluvia coming from bodies in a diseased state.

It communicates its contagion not only to those who approach the places in which it is generated, and the human bodies from which it flows ; but also will remain long entangled in blankets, beds, and other substances which have been in contact with the patient's body ; retaining its activity, and capable of infecting others at a considerable distance of time, or at a considerable distance of place, if unhappily those contaminated materials are carried to a distance.

In this manner one person who is not himself infected may infect another, the first being less predisposed to the disease than the second, and carrying the infection in his clothes from one in the fever, to another person in good health.

Although the contagious miasmata arising from the living human body, are not perceived to act at a great distance from their direct source, or the substances with which they are imbued ; yet it seems most probable that they do not immediately lose their virulence, but, after they are diffused in the atmosphere,

phere, continue in some degree to act in conjunction with the miasmata of marshes, with heat, obstructed perspiration, and the other causes, in producing fevers; and according to the various proportions of those causes, combined with the circumstances of season, climate, and the constitution of the patient, the nature of the fever is determined.

Having pointed out what are considered as the most common causes of fevers in general, I shall shortly hint what appears to be the most probable source of each particular species of fever, according to the division adopted above.

Other circumstances may assist, or possibly on some occasions produce them; but in general it appears that the effluvia of marshes is the cause of intermittent fevers.

Cold, of the inflammatory fever.

The human miasmata, of the nervous fever.

And that the mixed fever is the product of all the three sources, which as they happen to be proportioned, incline it sometimes to the nature of the inflammatory, sometimes to that of the nervous fever; and from the marsh effluvia it derives its remitting tendency, with other features resembling the intermitting fever.

It would not be a difficult matter to support this conjecture by plausible reasoning and illustration; but it is of little importance in itself, and of perfect indifference to me, whether it be believed or not.

Whatever may be the general or particular causes of fevers, none of them act with such certainty at all times, as that fever *must* follow, as often as the human constitution is exposed to their influence.

For although experience proves, that fevers of an inflammatory nature prevail in cold weather, and those of a remitting kind after heat and moisture; yet experience affords many exceptions to this general course,

course, and sometimes affords examples of the reverse.

We also see people seized with fevers at seasons when no epidemic reigns, and when they have not been exposed to any of the causes which are considered as the sources of that distemper:

And we see others preserve perfect health during the progress of the severest epidemics, and notwithstanding their being by necessity or imprudence much exposed to the infection.

For besides all the remote causes of fever, there must also be a particular disposition in the constitution of the individual, to favour the action of the morbid cause, and render him susceptible of the disease, without which, however much he may be exposed to the other remote causes, he will not, at that particular time, be seized with it.

Persons of a sanguine habit are certainly more subject to inflammatory complaints than those who are less plethoric ; as the more delicate and weakly are found to be more liable to the nervous fever, than the strong and robust. Other strongly marked peculiarities of constitution may predispose to particular diseases ; but that important power in the constitution, by which it is enabled to reject fever at one time, and of which it seems deprived at another, has never been explained.

Yet many chimerical systems intended to ascertain this, and demonstrate the immediate causes of all fevers and all their differences, have been received as satisfactory in different ages, being introduced by the influence of some great name, and agreeably to the prevailing philosophy of the times.

The different temperaments of the human body have been divided into the various classes of hot and cold, moist and dry ; and from the proportions in which

those

those were mingled, the causes and nature of fevers deduced.

At one period imagination so entirely got the better of judgment, that the cure of particular organs was expected from certain substances, for no other reason than a resemblance between that substance and the organ diseased. Thus euphrasia was recommended for complaints of the eyes, pulmonaria for those of the lungs, lemons for those of the heart, asarum and satyrion on account of other chimerical resemblances.

At another period all the phænomena of fevers were explained by the predominancy of acid, or of alkali, in the constitution; and at a different period nitre and sal ammoniac having been observed to refrigerate water, a supposed preponderency of one or both of these was thought a sufficient explanation of the cold fits of fevers. If the symptoms were very turbulent and ungovernable, their impetuosity was thought to be clearly accounted for by the deflagration said to result from the combination of sulphureous and nitrous particles in the human body.—And when any constituent part of the blood or juices was supposed to prevail in undue proportion, or any particular morbid humour supposed to exist, those enthusiasts seem to have been persuaded it was in their power to precipitate, distil, or sublimate them in the human body, as they could any substance in a pot, an alembic, or a tire of arundels.

The chymical were followed by the mechanical physiologists, who saw wedges and darts in the animal fluids, with which they exceedingly annoyed all their antagonists, and finally drove their predecessors almost entirely from the schools of medicine.

Many ingenious and learned men adopted the idea, that the operations of the animal œconomy are to be accounted for on mechanical principles, and the causes

causes of diseases and operation of medicines, are to be explained by the laws of hydrostatics.

There must however be insurmountable difficulty in applying the laws which govern passive matter to living animals ; and the axioms which are just when applied to inflexible pipes, will be found erroneous, and to lead into false calculations, when applied to those which are elastic, and changing their capacity every instant.

An obstacle of something of the same nature prevents our forming conclusions that can be relied upon, concerning the effect of septic and antiseptic medicines on the living body, from the effect they are found to have on dead animal substances.

The experience of ages has proved, that the great and ultimate object of the art of medicine,—*the power of curing diseases*, is more effectually attained by diligently observing the course and symptoms of distempers, and the effects of the means used for their relief, than by the most plausible reasonings on their supposed nature and causes. Yet the latter has proved more attractive to many ingenious men of the profession, and, for a reason sufficiently obvious, in a particular manner to such as are employed in lecturing to students.

No system was ever received with more universal approbation than that of Boerhaave. The acknowledged learning, ingenuity, and integrity of that illustrious professor, aided the plausibility of his theory in producing conviction.—The leading maxims of this system are, that all local inflammation depends on obstructions *ab errore loci*, as he terms it ; that is, when globules of blood get by mistake, as it were, into vessels whose diameters are too small to permit them to pass.

'That inflammatory fevers are owing to a viscosity

ty or lether prevailing in the mass of blood, and stagnating in the capillary vessels.

When this is attended with a particular acrimony in the juices, whether received before the fever, or formed by the fever itself, the disease he then supposes to be of the putrid class.¹¹

Such is the foundation of the doctrine taught for many years by Boerhaave at Leyden, in his time the most celebrated school of medicine in the world; and by the means of this he endeavours to explain all the phænomena of fevers, and to account for the various terminations of inflammation in resolution, suppuration, gangrene, or schirrus.

His audience heard him with implicit belief, and spread his doctrine with all the zeal of conviction over Europe.

The ideas of Boerhaave acquired additional force and celebrity from the valuable commentaries and illustrations of one of his disciples, the Baron Van Swieten, a man distinguished by his learning and talents, and placed at the head of medicine in Germany, by the well-directed favour of the late Empress.

So that no theoretical system of medicine was ever introduced more advantageously, was supported with greater abilities, or promised to be more permanent.

Of late, however, it has been strenuously attacked, loses ground daily on the continent of Europe, and in this island seems to be almost if not entirely overturned. But from whatever cause it proceeds, there indisputably does exist, during the cold fit of a fever, a stoppage of the blood and fluids in the minute arteries and excretory vessels of the body, as appears from the paleness of the skin and lips, dryness of the skin and mouth, and the drying up even

even of issues and ulcers. Those therefore who reject Boerhaave's explanation by a supposed viscosity or thickening of the fluids, were obliged to account for all those symptoms otherwise. They accordingly assert, that the fault does not lie in the circulating fluids, but in the extreme vessels, which we are told are suddenly seized with such a constriction as refuses all passage to the blood, as effectually as if it were converted into glue.

They insist farther, that if this viscosity were to be admitted, it must be supposed to take place *gradually*, and of course would require considerable time to be produced, and would indicate its progress by some uneasy feeling or complaint ; but the cold fit of fevers often attacks at once without any previous complaint, unless it is a sense of weakness a short time before.

In their opinion, therefore, a spasmodic constriction of the extreme vessels accounts for all the phenomena of the cold fit much more naturally, and is analogous to the effect of certain sudden affections of the mind, as surprize and fear, which instantly produce the same phenomena.

Besides, the lensor supposed, if it really took place in a liquor whose free circulation is essential to life, would never fail to prove mortal ; but as people daily recover from inflammatory diseases, this circumstance alone is a proof that no universal lensor does take place in such diseases.

It is farther alledged, not only that there is no positive evidence of viscosity, but that there is reason to believe that even at the beginning, as well as during the progress of inflammatory fevers, the blood is less viscid than in perfect health ; for it is natural to think that a thin liquor, other circumstances being equal, will coagulate more slowly than a thick ; and as it is found, in fact, that the blood of people labouring under

der inflammatory disorders is longer in coagulating when drawn out of the body, than that of people in perfect health, those who combat the notion of Lentor presume from thence that the blood of the former is the thinner of the two ; and add, that the gluey buff coloured pellicle which forms itself on the surface of inflamed blood, and was considered as an irrefragable proof of the morbid viscosity in question, is no proof at all, this pellicle being nothing else but the natural coagulable lymph of the blood left at the surface and forsaken by the red particles, which the slow coagulation of inflamed blood permits to fall to the bottom.

With regard to the theory of local inflammation *ab errore loci*, or blood globules getting into vessels which from the narrowness of their diameters and conical form they cannot pass, and which, it is said, the succeeding fluid must propel with increasing force, and produce the following symptoms ; *swelling* and *redness*, by the accumulation of blood in the minute vessels ; *pain*, by the distention of those vessels ; *heat*, by the agitation and rubbing of the globules ; and *throbbing*, by the beating of the obstructed artery ; or, in one word, produce *inflammation*.

All this is without ceremony or circumlocution now denied ; and it is farther asserted, that when examined by a microscope, the blood is seen to pass through the arteries of an inflamed part with as much ease and more rapidity than through those of a part not inflamed ; and whether the part be inflamed or not, that when a red globule enters a vessel too small for its transmission, it is forced back by the contraction of the vessel ; for the force of the heart in those minute and distant arteries is spent, and has no effect, and the globule thus thrust

back enters some larger anastomosing branch, without occasioning any obstruction or stagnation.

The many sensible reflections and practical observations made by Boerhaave, and the judicious commentator on his works, will continue a permanent and useful monument of their knowledge and industry, although the whole fabric of their theory, so long considered as solid and substantial, should vanish like the baseless fabric of a vision.

We need be the less astonished at finding the theory of Boerhaave in danger of being overthrown, when we consider that one of the most important and comprehensive opinions of all medical antiquity, which originally came from Hippocrates himself, and like a solid body falling from a vast height, seemed to acquire additional force as it descended through admiring ages, is now openly impugned, and its truth disputed. The opinion in question is, that a fever is nothing else but an effort of Nature to expel some noxious matter from the constitution; but before it can perform this, it is necessary very often that this noxious matter should undergo coction. *Cocition*, in medical language, is a term used to signify the process by which Nature attempts to operate such an alteration in this noxious matter as deprives it of its pernicious qualities, or renders it capable of being expelled through some of the emunctaries of the body. The noxious matter, however, is supposed to be averse to this coction, and struggles against it with more or less success, according to the virulence of the matter and the powers of the constitution. In this struggle between the noxious matter and the constitution the fever consists. When Nature is strong enough to perform perfect coction and expulsion, health is immediately restored; when Nature is quite unequal to the task, the patient dies; when she performs

forms it imperfectly, there is an abatement of the disease; but a new effort must be made after a short pause, and this is called relapsing into the fever.

This doctrine was believed with a degree of conviction that in general is only compelled by mathematical demonstration, or given to the evidence of the senses; and physicians were accustomed to speak with as much certainty of the coction which takes place in a fever, as of that carried on in their kitchens.

But this is the age of freethinking; and some daring spirits treat the whole of this venerable doctrine as a mere chimera.

"What can fevers, almost instantly produced by cold or terror," say they, "have to do with morbid matter?

"The impression of cold, or an affection of the mind, are neither a noxious substance coming from without, or generated within the body,

"When a fever with alarming symptoms is removed by the critical discharge of a little blood from the nose, where is the coction?

"The blood discharged differs in nothing, as far as can be perceived, from what remains in the body.

"When the crisis is by sweat, the same happens; nothing seemingly more morbid, no difference whatever can be discovered from that critical sweat, and the same evacuation on any less important occasion*.

M 2

"There

* Fevers are sometimes distinguished by the nature of the noxious matter they are supposed to be struggling to throw out of the body; and the various qualities of this hypothetical matter are described with as much accuracy as if it had been examined by a naturalist, and analized by a chymist. The accuracy

" There are indeed diseases," continue they, " of a different class, in which fever is evidently the effect of a specific kind of morbific matter, received into the body, and where an irruption takes place in consequence of the fever, which not only clears the constitution of the noxious matter introduced, but deprives it of the power of ever again receiving it."

Of this nature is the small-pox, the chicken-pox, the measles, and some other specific contagions, of which the human body is susceptible only once*.

But, in those instances it sometimes happens that the fever terminates before the matter is expelled, and the contagious matter which produces the disease is never altered in its nature, or rendered mild and innocent by coction or otherwise, but is thrown out of the body, retaining all its original virulence, and capable of infecting thousands.

The objectors above alluded to make no scruple, therefore, of asserting, that nothing that can with propriety be called concoction of morbific matter, particularly if altering its nature be implied in that term, takes place in fevers; neither can any such thing happen in the diseases just mentioned;

accuracy and minuteness of those descriptions are sometimes urged as proofs of the existence of the matter in dispute, and of the truth of the doctrine that fevers are efforts of Nature to throw it out of the body. Without entering into that question, the descriptions of its qualities are certainly no better proofs of its existence, than the records of the trials and condemnation of witches are proofs that it once was the fashion in this island for old women to ride through the air on broomsticks, and to have personal communication with Satan; or than the ruins of the ancient temples are of the existence of Jupiter, Juno, Apollo, Venus, and all the deities of Greece.

* It is very singular that it is the *human* body only that is susceptible of these particular contagious diseases; the brute creation being entirely free from them, as well as from the venereal disease.

ed, since the noxious matter which produces the disease is thrown out of the body as unconcocted and noxious as when it entered.

It has been attempted to give some idea of the nature of concoction, by comparing it to the process of digestion, in which the different kinds of food, after remaining some time in the stomach, lose their own peculiar natures, the finer parts being mingled and transformed into one uniform liquor before it enters the mass of blood, and the grosser being expelled out of the body ; and during the process of digestion it is observed that there is a disturbance and uneasiness in some degree like that occasioned by a slight fever. But the analogy fails in the most essential point ; for even admitting that morbid matter received or formed in the body is the cause of fever, there is no evidence that any alteration is made upon it by the process of concoction ; but nobody will question that a striking one is made on food by digestion.

After all, those who are the most averse to the ancient doctrine of coction seem to object rather to the expression than to the meaning ; for while they deny that noxious matter received into, or formed within the body, is the proximate cause of fever, and that Nature concocts this matter during the course of the fever, and expels it, or renders it innocent before the disease terminates ; yet they acknowledge, what comes pretty nearly to the same thing—they allow of the *vis medicatrix naturæ*.

Let us consider for a moment what then is the state of the controversy.

The old orthodox doctrine is, that a fever is an effort of Nature to change or concoct some noxious or morbid matter that is in the constitution, so as that it shall either be rendered quite innocent, or thrown out of the body.

The new heresy is, that there is no such thing as coction of morbid matter, but that as often as the body is injured, Nature directly excites such motions as are suited to remove the cause of the injury, obviate its bad effects, and restore the constitution to its wonted good health. The difference between the two doctrines is not prodigious.

The fate of every theory hitherto invented to explain the proximate cause of fevers, might, one would naturally think, deter from an attempt in which so many have failed; yet so partial are we to what we conceive to be our own original ideas, so natural are such investigations to the active and inquisitive mind of man, and so necessary are disquisitions of this nature to those whose profession it is to lecture to medical students, that it is probable a new theory will always be founded on the ruins of the last that is over-set.

The latest attempt of this kind was made by a person for whom I must ever have the highest esteem, from whom I received my earliest medical instructions, and whose character and abilities will give weight to every opinion he adopts.—The theory in question is shortly this:—Whether the remote causes of fever be fear, cold, contagious miasma, or whatever else; their first effect is that of diminishing the energy of the brain, and thereby weakening all the functions, particularly the action of the extreme vessels.

Debility then is the first symptom of a fever, and the cause of the cold fit and a spasmodic contraction of the extreme vessels, particularly those of the surface, supposed to attend it.

It is not found easy to explain how debility produces this spasmodic contraction, but it is imputed to the *vis medicatrix naturæ*, or the law in the animal œconomy above mentioned, by which motions are excited to obviate the effects of any thing noxious to the constitution;

tion; and that the spasm exists, appears from the suppression of all excretions, and the shrinking of the external parts, during the cold stage. This proves an indirect stimulus to the sanguiferous system, by throwing the blood back with violence upon the heart and large arteries, and exciting them to stronger and more frequent contractions; which increased action of the heart and arteries continues till it restores the diminished energy of the brain, extends this energy to the extreme vessels, overcomes the spasm, restores their action, on which sweat breaks forth, the other excretaries are also relaxed, and the fever abates.

Such (abridged and imperfectly sketched) is the doctrine of fever taught by Dr. Cullen, a name which must give it weight, independent of its intrinsic merit; which no doubt will appear still greater in the eyes of those who have the advantage of hearing from the mouth of that enlightened physician all the illustrations, explanations and proofs, which his ingenuity and eloquence can bring in its support.

Whether it is in danger of falling, when it loses those great props; and whether it will be more or less permanent than its predecessors', is yet to be tried.

II.

OF INFLAMMATORY FEVERS.

IN treating of fevers in general, it was remarked, that in these diseases the human body is liable to two morbid states, with very different symptoms.

In one, the heart and whole arterial system is stimulated to rapid and strong exertions, while the nervous system seems less directly affected.

In the other, the nervous system is more immediately affected; there is a weaker exertion of the heart and arteries, and more evident signs of general debility.

The disease at present under discussion is accompanied with the first of these states, and with many of the symptoms which attend local inflammation. From this last circumstance it derives the name inflammatory.

Some physicians have asserted, that no inflammatory fever can exist without local inflammation.

This is saying, in other words, there is no such disease as an inflammatory fever; for when there evidently is a local inflammation, the complaint is not called a fever, but derives a name from the part inflamed.

But those who assert, that as often as the symptoms of this fever appear, there must be a particular inflammation of some part of the body, acknowledge at the same time, that they cannot always tell where that particular inflammation is, because it may be in some

some internal, indolent, or insensible part, and consequently is neither to be seen nor felt.

I do not know whether this manner of reasoning will be thought *convincing*, but it certainly is *convenient*.

If along with the symptoms of fever, any particular part of the body is found in an inflamed state, those who support the opinion in question tell you, this is exactly what they expected, and knew from the beginning to be the case.

And if you carry them to a patient who has all the symptoms of this fever, and yet *no partial inflammation* appears, they then tell you they are very sorry you cannot see nor the patient feel the particular part where the inflammation is; but they are sure, from the symptoms, there must of necessity be some particular part inflamed; that this was all they ever asserted, for they never had undertaken to make you see or the patient feel more acutely than usual.

On such occasions those gentlemen seem to forget, that however indolent and insensible certain parts of the human body may be in a natural state, inflammation never fails to rouse and render them sensible; and although this were not the case, still the seat of inflammation would probably be discovered by opening the body after death; but there are many instances of people dying of inflammatory fevers, whose bodies have been examined and dissected by accurate anatomists, and no appearance of local inflammation found.

When fevers therefore display every inflammatory symptom, while no part of the body can be perceived to be particularly affected, it seems highly reasonable to believe, that the fever is not supported by any partial inflammation, but is diffused over the whole system.

Inflammatory fevers occur at any season of the year, and in any kind of weather ; but they are most likely to be produced after a sudden change from mild weather to frost, or on a change of the wind from any other quarter to the north or north-east.

The same sudden changes are undoubtedly often followed by catarrhs by the cynanche tonsillaris, or inflammation of the tonsils, by pleurisies, and other diseases of local inflammation ; all which complaints have many symptoms in common with this fever, but are each of them distinguished by peculiar symptoms. The pleurisy, for example, occasions coughing and painful respiration ; the fore throat, difficult deglutition, and so on.

When partial inflammation is not very considerable, or affecting an organ of great delicacy and importance, the action of the heart is not much augmented, and of course the feverish symptoms are but moderate, although there seems to be a great impetus of blood in the vessels of the inflamed part.

But when the topical inflammation affects a vital organ, as the lungs ; or when the inflammation is violent and extensive in any part of the body, the heart itself is then stimulated to rapid and strong exertions, and the whole mass of blood displays the same appearance as in the inflammatory fever.

After a person has been attacked with the usual symptoms of the inflammatory fever, if he suddenly perceives a throbbing pain in a particular part, it is an indication that the disease is not what is strictly called an inflammatory fever, but a local inflammation. Whether that is to be considered as a fortunate or unfortunate circumstance, depends on the nature of the part that now seems peculiarly affected.

If there is an uncommon clamminess of the mouth and throat, with a sharp pain darting through one or both ears in swallowing, the disease will turn out an inflammatory

flammatory sore throat, and probably a suppuration of the tonsils will take place. Soon after the same feverish symptoms, if there comes a frequent dry cough, with oppressed breathing, and pain in one side, a pneumonic inflammation is threatened.

The first case might be reckoned a safe, the second a dangerous exchange for an inflammatory fever.

Fevers entirely of an inflammatory nature are, I imagine, not very frequent any where; certainly those of a mixed kind are most common in this island.

Even those which begin with every symptom of inflammation, and continue for some time with the same indications when prolonged beyond the usual term, that is, beyond the second week, without a favourable crisis, then discover symptoms which are considered as belonging more properly to the nervous fever; this circumstance sometimes gives rise to disputes of small importance in themselves, but which have been attended with disagreeable consequences.

A physician called at the beginning of a complaint, is asked what is the patient's disease? Perhaps he answers, an inflammatory fever: Another called towards the end, when stupor and subsultus tendinum have taken place, being asked the same question, may very probably call the disease a nervous fever. They are both in the right; yet an impression is left on the minds of the patient's relations, that one or other must have been in the wrong.

Names can have no influence on a judicious and experienced practitioner, who carefully examines symptoms, weighs every concomitant circumstance, and forms his treatment accordingly. But there are practitioners who pay more regard to the name than to any other circumstance of the disease: Only be so obliging as to furnish them with that, and it is all the information they require; let it be inflammatory fever, nervous

vous fever, hectic fever; be what it will, they consult the last new practice of physic, and give you a prescription directly.

I knew an instance of a physician who was called at the commencement of a fever, which he distinguished by a name applicable to the symptoms which at that period of the disease were predominant, and he prescribed accordingly; but not having it in his power to continue his attendance when the fever had changed its nature, the patient was put under the care of such a practitioner as has been described above; who, among other circumstances, being informed by the attendants of the name by which his predecessor, a man of some authority in the profession, had distinguished the disease, overlooking the alteration which had since taken place, this sagacious Doctor fixed his attention upon the name only; and (as the first physician expressed himself in narrating the story) having consulted his oracle, had very near killed the patient by approved good prescriptions.

I leave it to those who have had the greatest opportunities, to declare, whether they have not in the course of their experience met with cases exceedingly similar to this.

It was hinted in the preceding chapter, that there was good reason to believe that the true inflammatory fever takes place independent of marsh or human miasma; for when *they* co-operate, the fever is of a mixed nature, displaying at once symptoms of inflammation, of nervous debility, and greater tendency to remission than is usual in inflammatory fevers; and what renders this more probable is, that intermittent and malignant fevers, which we have such strong reason to be convinced proceed from these causes, generally happen in spite of all the care against cold and all the attention to regimen which the patient can take.—Let him do as he pleases, if he lives in the neighbourhood

hood of fens and marshes, he will probably be seized with an ague; and let a person be as guarded as possible in other respects, if he has any personal intercourse with people in malignant fevers, he will be in great danger of catching one also; and very possibly the disease may come, in the one or the other case, when it is least expected. Whereas the inflammatory fever, although more apt to come at one season than another, when people are unguarded, yet seldom or ever, in any season, attacks those who avoid excesses in exercise and regimen, and are careful not to catch cold. So far from appearing when least expected, we generally know and can point out some particular piece of imprudence or inattention, to which the inflammatory fever may reasonably be imputed. But if it is obstinately insisted upon that these miasmata must have a share in this fever, we shall only say, that when there is the strongest reason to conclude that such miasmata do act in conjunction with cold, the effect is generally different; but, as was observed on a former occasion, it is difficult to prove that an invisible substance is not present; however, according to Celsus, "has laten-
"tium rérum conjecturas ad rem non pertinere, quia
"non intersit, quid morbum faciat, sed quid tol-
"lat."

The youthful, the sanguine, and the active, are most liable to this disease. The same elegant writer probably alludes to this when he says, "Si
"plenior aliquis, et speciosior, et coloratior factus
"est, suspecta habere bona sua debet."

One reason for young and active people being more liable to this fever than persons of more advanced age and less activity, no doubt is, because the former are more prone, from imprudence and love of bodily exertions, to expose themselves to the situations that bring it on.

It generally invades suddenly with a strong cold fit, followed by those symptoms which mark vigorous contractions of the heart, a strong, rapid, full, and equal pulse, excessive heat, a remarkable diminution of all the secretions, evinced by a dryness of the skin, tongue, throat, nose, and bowels; great thirst, loss of appetite, with impairment of the smelling and taste; the urine of a high red colour, scanty, and evacuated with heat; the face full and florid, with a redness of the eyes and aversion to light; pain and confusion of the head; quick respiration; and sometimes a dry cough; yet the patient does not display much alarm about his own situation, nor that dejection of spirits which attends the nervous fever.

When he seems just ready to fall asleep, or has actually begun to sleep, he is apt to awake with a sudden starting. This symptom is also common in the eruptive fever of the small-pox.

The abatements or remissions are not very evident, and always short when they appear.

When this fever is very violent, and the symptoms not relieved in some degree by evacuations at the beginning, a high delirium ensues, the patient cannot be kept without difficulty in his bed, the pain and confusion in the head rises to frenzy, and he is sometimes hurried off on the fifth or sixth day.

The nervous fever generally is of longer duration than the inflammatory; yet in some very malignant cases of the former, the patient is also carried off with symptoms of high delirium before the seventh day.

What distinguishes the two in such violent cases is, that in the inflammatory the pulse is vigorous almost until the last, and the patient himself displays great bodily strength in his struggling; whereas

as in the nervous, the pulse is contracted and small, and although the patient is exceeding restless, and struggles also to get out of bed, yet his efforts are easily controuled.

But the most frequent termination of this fever is about the seventh, or before the end of the ninth day, and always before that of the fourteenth or fifteenth; for when prolonged after that time, it totally changes its character, the phlogistic diathesis is gone, it is no longer an inflammatory fever. The same symptoms which belong to the nervous fever then appear, and require the same treatment.

The obvious indications of cure in this disease are, to abate the violent action of the heart, which gives rise to all the other symptoms, and relax the constriction of the vessels on the surface of the body, which seems to support and aggravate them.

Nothing has been discovered since the earliest medical records, which so effectually gives relief in all diseases where the blood is too impetuously propelled, as diminishing its quantity. In doing this, however, great attention must be paid to the degree of violence of the disease, the sex, age, and constitution of the patient.

From a strong man of a sanguine habit it may be expedient to take a pound of blood at once, and to repeat the operation, if the violence continues, in the same or in diminished quantity, a second or third time, at the distance of eighteen or twenty-four hours.

In plethoric patients the pulse becomes sometimes more free and even stronger after bleeding than it was before; by restoring that degree of elasticity to the arteries which was impaired by too great fulness. The kind of oppression of the pulse which proceeds from plenitude, can easily be distinguished
by

by practitioners of attention and experience from that occasioned by weakness.

As this is the most important thing that can be done in a pure inflammatory fever, it ought to be done at the beginning; for after the third and fourth day it is thought not so proper, and is certainly not so effectual. If, however, the inflammatory symptoms continue with unabated violence, and if from the head-ach or oppressive breathing the brain or breast seem particularly threatened, those circumstances plead more strongly for this evacuation at any period of the disease, than the hypothetical notion of interrupting coction, or any other consideration, can do against it.

It may be thought superfluous to add, that in case the first bleeding diminishes the strength and fulness of the pulse, and, of course, the violence of the other symptoms, a second bleeding, and still more a third, would be improper; and even although the pulse should afterwards seem to return to its former state, the operation ought to be prescribed with more caution, and if prescribed, performed with more moderation than if the first bleeding had made no evident change; for what has happened is a proof that the inflammatory diathesis is not so obstinate, nor is there so great a probability that it will continue throughout the disease as there was before that change happened.

I have had frequent occasion to observe, in the early part of my life, that in hospitals, repeated bleedings are seldom requisite than elsewhere; for the effluvia of a number of sick has a constant tendency to debilitate, and effect that change which is called putrescent, however vigorous the patient's constitution is, and however inflammatory the disease for which he has brought into the hospital may be.

In fevers of the latter kind the heat is imputed to an augmentation of the *intestine*, not of the *progressive* motion of the blood; and therefore diminishing its quantity is not thought a means of abating it; but, without considering at present whether that conjecture is well founded or not, experience proves that bleeding, which is indispensable at the beginning of the inflammatory fever, does harm in the nervous.

On weighing the circumstances that may determine the propriety or impropriety of repeated bleedings, the nature of the diseases which prevail at the time ought to have considerable weight.

A person of a strong plethoric habit may in consequence of exposing himself to cold after being heated with violent exercise, or of some other piece of imprudence, be seized with every symptom of an inflammatory fever; at a time when putrid diseases are epidemic.. In this case it may be highly requisite that he should lose some blood; but in prudence he ought to lose less than if inflammatory complaints were at that time the reigning diseases:

For although the violent cause which brought on the disease has force to overcome every thing which opposes it in stamping the character of the fever, yet the qualities and disposition of the atmosphere will afterwards gradually operate in changing its nature to that of the prevailing epidemics:

As a viscid scum of a whitish or buff colour is generally observed to form on the blood as it cools, soon after being drawn out of the body, in all inflammatory diseases, this buff was supposed to point out the degree of inflammation, and was considered as a strong proof that inflammation in general proceeded from a viscidity or lensor in the blood.

But this phænomenon being now accounted for in a different and more satisfactory manner, can no longer give any aid to the hypothesis it was formerly brought

to support ; yet although it cannot now be allowed to arise from viscosity in the blood, it is still a proof that inflammatory diseases do produce such a change in this fluid, as determines its constituent parts to arrange themselves and settle in a different manner from what they do in perfect health and in other diseases ; and as this propensity in the blood seems to increase with those inflammatory complaints, the thickness of this buff, in many cases, may still be considered as an index, though but an uncertain one, of the degree of inflammation.

What renders it still more uncertain is, that it depends in some degree on the rapidity or slowness with which the blood flows from the vein. When it rushes in a free stream without touching the arm, the same blood will shew greater thickness of buff, than if it falls languidly, drop by drop, down the arm.

And also because the blood of pregnant women, though otherwise in perfect health, shews the same kind of buff on the surface as that of people in fevers, pleurisies, and other inflammatory diseases ; and sometimes this fizy pellicle is found on the blood of patients even in the nervous fever. But when the inflammatory diathesis prevails strongly, the crust upon the surface is generally found to adhere more tenaciously to the crassamentum beneath, than when the inflammatory disposition is weaker, or when the opposite diathesis prevails ; and in the latter case, what crust there is, does not appear of such a decided buff colour, but seems rather of a greenish colour, owing to the crassamentum shining through it, because of its thinness.

After diminishing the quantity of blood, what has the most immediate tendency to give relief in this disease, is to cleanse the intestinal canal. Clysters alone are not sufficient for this purpose, as they often do

no more than empty the rectum, leaving much impure matter in the higher bowels.

It is therefore highly expedient soon after bleeding, to give such a purgative as will effectually empty the whole course of the canal, and at once remove the irritation of indurated fæces and pent-up humours, prevent acrimonious absorptions, drain the arteries and other vessels which pour their excretions into the cavity of the intestines, and by this evacuation weaken the too violent contractions of the heart and impetuosity of the circulation; in other words, abate the fever.

The properest purgatives for answering all those intentions are those whose cooling and deobstruent nature enables them to wash away the contents of the bowels effectually, without occasioning gripings, or otherwise stimulating the system: The *materia medica* furnishes an ample variety of such. What in my opinion is equal if not superior to any other, is a solution of *sal catharticus gläuberi*, or *sal rupellensis*, in water, or in a decoction of tamarinds; to those whose stomachs cannot bear the saline purgative given alone, the milder vegetable purgatives, of which rhubarb and senna are the best, may be given either alone, or combined with *sal polychrestus*, *cremor tartari*, or *tartarum solubile*.

After the cavity of the intestines is entirely emptied by a purgative at the beginning, emollient clysters, administered at proper intervals, will be sufficient to prevent costiveness through the course of the disease. They are also supposed to promote urine, and to act as fomentations.

Vomits can seldom be proper in this fever; let us recollect the symptoms, a hard, full and impetuous pulse, burning heat, a swelled glowing face, the vessels of the eyes turgid with red blood; in such a state of the body, when the vessels seem ready of themselves

selves to burst with plenitude and rapid circulation, to excite the violent exertion of vomiting might be highly dangerous. Antimonials, however, given in such small doses as do not occasion vomiting, are often of great service, by promoting perspiration, and gently moving the bowels, so as to render other laxatives unnecessary. In this way they very often contribute to abate the force of, or entirely to throw off the fever ; and none operate more gently and more effectually than Dr. James' powder given in small doses.

As the most distinguishing features of this fever seem to depend on the violent action of the vascular system, whatever contributes to stimulate must do harm. The impressions made by noise, light, external heat, and thirst, are all of this kind. In preventing and removing them we follow *the impulse of nature*, which inclines the patient to stillness, to darkness, to a cool well-ventilated chamber, and the constant use of acidulated drinks.

The exclusion of light and of noise was always considered as expedient in fevers ; but it is only a late practice in this island to indulge the patient in breathing a cool air, and in being freed from an oppressive load of bed-clothes. Yet this is so obvious and so natural a way of giving relief to those who suffer from heat, that nothing could have prevented its being universally adopted, but some deeply rooted prejudice or erroneous theory respecting the nature of fever, and the necessity of forcing sweats. That these opinions were not founded on fair experience is now evident, from the comfort and benefit found to flow from allowing the patient's bed-chamber to be frequently refreshed with streams of cool air, by sprinkling it with vinegar, by keeping it always unencumbered with the persons and unheated by the respiration of too many people, and by relieving his body from oppressive covering.

It is of service also to wash the hands and face of the patient from time to time with tepid water and vinegar, which may be done more conveniently in a sitting than in a horizontal posture. To be seated in an easy chair for a considerable part of the day, instead of laying in bed, is peculiarly proper when the head is much affected, and a delirium is threatened; because, in an erect posture, the blood moving contrary to its own gravity, its motion is retarded, and its impulse upon the brain diminished.

Shaving the head, washing it frequently with vinegar, and keeping it thinly covered, are always refreshing, and sometimes give considerable relief.

Besides abating the uneasy and irritating sensation of thirst, indulging the patient to the height of his desire in proper drinks, is also of service, by diluting and cooling the overheated blood and juices.

These drinks should be varied, and adapted to the varying taste of the patient; pure water, barley water, seltzer water, lemonade, imperial, rennet, orange, lemon, or sorrel wheys, raspberry or currant jelly dissolved in water, apple tea, balm tea acidulated with lemon juice, and other combinations, may be given with propriety; and he should not only be allowed but even prompted to drink them in considerable quantities; for those cooling and mild subacid drinks not only quench and dilute, but also afford materials for free perspiration, and contribute to remove the constriction of the vessels. The manner in which they contribute to this is disputed. Some think it is by *dilatation*, as the liquors pass through the excretaries of the vessels; but to this it is objected, "that the obstruction must have already been removed before they *can* pass;"—to which those who support the idea of dilatation reply, "that the contraction is never so great as to prevent perspiration altogether, but only to diminish it: That thin di-

" luting liquors received into the blood, tend in the course of circulation to the extreme vessels, and by an uniform and gentle pressure, swell the larger vessels, and so gradually dilate and remove the contraction of the smaller."

This mechanical method seems improbable to others, who explain the effect of the liquors in tending to remove the spasm, by the sympathy and connection between the stomach and skin, which they support by various illustrations ; this in particular : " A draught of cold water," say they, " is often a pleasant and effectual means of producing sweat ; and it has that effect long before it can be supposed to have entered the circulation, and have been determined to the skin."

The material thing to know is, that those cooling drinks do certainly promote perspiration, and abate the fever ; the means by which they do it, if less certain, are also less important.

The tepid bath has often been recommended in this fever, upon the supposition that it must be of service in promoting the relaxation of the vessels on the surface, which seems so much required ; and when, on account of the difficulty of moving the patient, the entire bath cannot be used, steeping and fomenting the legs, thighs and belly, with flannel cloths wrung after being dipped in warm water, or applying large bladders filled with warm water to the patient's body, have been recommended as substitutes to the bath : But the pulse is so vehement, and the skin so hot in this fever, that any additional heat seems dreadful to the patient ; and it is almost impossible to use the bath or these fomentations, without doing more harm, by fatiguing and heating the patient, and stimulating the heart to more rapid contractions, than service, by the relaxation they are expected to produce.

Keeping

Keeping the patient's body lightly covered, and admitting a cool stream of fresh air to pass from time to time through the bed-chamber, is a more probable means of abating the violence of the fever than such fomentations, whose inconveniences are instantaneous, and whose benefit is uncertain.

With regard to diet, very little needs be said ; Nature herself generally takes care that no error shall be committed during the continuance of this disease in that article ; even when injudiciously urged, the patient seldom is persuaded to swallow any thing but drink : If by accident he should have an inclination for something more solid, panado, roasted apple, a few grapes, or some other mild ripe fruit, is all that should be allowed.

The most important relief that art can afford in this fever, proceeds undoubtedly from the evacuations of bleeding and purging at the beginning, the continued use of cooling diluting drinks, with antimonial alteratives ; all the good effects expected from these, however, will be promoted by the aperient, quenching, refrigerating, and diaphoretic qualities of some of the neutral salts, particularly of nitre ; as much of this salt therefore as is thought requisite, may be dissolved in the patient's drinks.

One inconvenience sometimes attends the use of this medicine in due quantities, which is its sitting uneasy on the stomach. This effect will be prevented, in some constitutions, by combining the nitre with the saline draughts of Riverius, instead of mixing it with the patient's drinks ; fifteen or twenty grains of the former may be added to each of the latter, and given every four or every six hours : But if the nitre still seems to give uneasiness, Riverius' draught, which is equally agreeable to the taste and stomach, may be given alone, and repeated every two or three hours.

This fever sometimes is entirely carried off by a small hemorrhage at the nose, and often yields to the evacuations used at the beginning ; if neither happen, but yet the symptoms seem considerably checked, and their violence abated, in all probability a favourable crisis by sweat may be looked for about the end of the first week ; but whether it should take place then, or at some future period, the following symptoms announce the abatement of the fever : The pulse becoming softer and slower, the head-ach and thirst abating, the urine increasing in quantity, and moisture returning to the nose and mouth. Soon after these flattering appearances an universal sweat breaks forth, the urine deposits a light reddish or a white sediment, the patient gets some refreshing sleep, and the pulse becomes moderate, the fever is gone, and the patient requires nothing but a gradual return to nourishing diet to restore his former health.

III. THE

III.

THE REMITTENT OR MIXED FEVER.

HAVING endeavoured to describe the symptoms, and detail the method of cure, in what is, strictly speaking, called the inflammatory fever, before I proceed to that in which the symptoms are of a nature directly opposite, I shall give the best idea I can of a fever much more common than either, in which the symptoms which proceed from an over-violent action of the heart, are blended with those which seem to proceed from marsh or human miasmata, and which indicate a direct affection of the brain and nerves.

One reason for preferring this order is, that when the diathesis which reigns during the former, and which appears at the beginning of this mixed fever, is subdued by the continuation of either disease, they then entirely assume the same symptoms and appearance which occur in the nervous fever, and are to be treated in the same manner.

In enumerating the remote cases of fevers, a stoppage of the perspiration, by exposing the body to cold, was assigned as the usual cause of the inflammatory fever, and this not from any reasoning *a priori* on the nature of cold, or the probable effects it might produce by shutting up the perspirable matter or otherwise, but merely because we see that inflammatory diseases of various kinds, and fevers in particular, often occur after the body has been

been so exposed, and when we know of no other cause to produce them.

In like manner we conclude, that the vapour arising from stagnating water and putrefying vegetable and animal substances, being absorbed by or applied to the human body, produces intermittents ; but we form this conclusion from no philosophical deduction drawn from an investigation of the nature of the vapour, but simply because intermittents are most frequent in low and marshy countries, where this vapour most abounds.

And having observed that a still more malignant fever often arises in places where men are greatly crowded together, we infer that the effluvia or miasmata of the human body produce the nervous malignant fever.

But although no human genius or investigation would discover, *& priori*, that cold produces inflammatory fevers ; the vapour of marshes intermittents, or the human miasmata nervous fevers ; yet when we have so much reason to think that this is really the case, a very moderate capacity would suspect that those causes acting in conjunction, would produce a disease complicated with the symptoms of all the genera. It would not be unnatural even to proceed to other conclusions, such as, that this mixed fever would be most prevalent, when an uncommonly cold and moist autumn succeeded an uncommonly hot summer ; that in the winter and spring the inflammatory symptoms would be stronger than in the summer or autumn ; that it would be more severe in fleets and armies during campaigns, because sailors and soldiers are then more exposed than other men to the influence of all the three causes ; that in armies the foot soldier would be more liable to the disease than the dragoon, the private sentinel than the officer ; that the symptoms would

would vary in different countries, according to the degrees of heat, cold, and moisture ; that in barracks, and in hospitals, the nervous symptoms would preponderate, and in the field, the inflammatory ; and finally that the various constitutions on which this disease might be engrafted, would contribute to form various shades and differences in the symptoms.

All those inferences, which seem so obvious, are confirmed by experience.

This mixed fever is described under various names by different authors, particularly under those of bilious fever, remitting fever, autumnal fever ; which descriptions when attentively considered, are found to imply a disease essentially the same ; but wherein particular symptoms predominate in one case, and others in another, in consequence of the state of the weather, the constitution of the patient, and the place in which he resides at the time he labours under the complaint. Perhaps all the above names might be objected to on good grounds : *Bilious* may be said to be improper, because the symptom which gives rise to the name does not always attend the disease ; *remitting* may be objected to, as not sufficiently distinguishing, because all fevers remit in some degree ; and *autumnal* may be thought equally open to criticism, because the disease occurs also in other seasons.

Whichsoever of those names I may occasionally use in treating of this mixed fever, I shall always mean the same disease, although I may apply that name which I think best adapted to the symptom under consideration at the time.

The mixed fever usually begins with a feeling of weariness, a frequent inclination to yawn, an irregular sensation of cold, approaching to chilliness, a confused

confused pain in the head, nausea, thirst, and very often vomiting.

It seldom attacks so briskly or suddenly as the inflammatory fever. The pulse, though hard and quick, is not so strong, full, and equal; neither is the heat so great nor so uniform; the remissions are more evident and permanent; and when they appear, there is a moisture on the skin, which seldom is found at the beginning of the true inflammatory fever. The nausea in this fever is greater than in the inflammatory, and more apt to produce bilious vomitings, which are generally preceded by a pain about the pit of the stomach. In the inflammatory fever the tongue is dry; in the remitting fever it is covered from the beginning with a whitish moist mucus, which gradually, as the fever advances, becomes dry, and of a brown colour.

The symptoms both of the inflammatory and the mixed fever augment in the night; but in the latter there is a remission attended with sweat towards morning; after an abatement of a few hours the same symptoms return, but are seldom introduced any more by a sense of cold or chilliness.

In this manner the fever sometimes continues, with accessions towards night, and remissions in the morning, for several days; the former, however, gradually gaining ground, till at length the latter are hardly perceptible.

There are instances of this fever attacking in a much more violent manner, the patient complaining of acute head-ach, thirst, excessive heat, and the fever increasing within a few hours after his being first seized, to a high and frantic delirium. I have seen many cases of this kind in Dutch Brabant; for this last symptom seldom or never happens in the remitting fever, except in hot climates,

or

or if in a moderate climate, in the moist, low, and marshy countries, at the hottest season of the year, and to those who from necessity or imprudence have used severe exercise in the midst of fogs, or during the ardour of the sun.

Sir John Pringle gives instances of such violent cases ; they happened in the flattest and most foggy country in Europe, in the neighbourhood of Bois-le-duc, to soldiers obliged to use hard exercise on the duty of foraging, while the adjacent plains were inundated *.

But in all those cases the influence of marsh miasmata formed an essential difference between them and the inflammatory fever, arising also from violent exercise, but used in countries free from all such miasmata, as is hinted in the foregoing chapter on fevers in general, and also in that on inflammatory fevers § ; for in the former, notwithstanding the suddenness of the attack and the high outrageous delirium, after a few returns of such paroxysms, there are so great signs of debility as to occasion fainting, when the patient is raised from a recumbent to an erect posture.

The patient is also generally troubled with much nausea and retching, and the delirium goes off in a few hours with profuse sweat, in some cases returning next day, and remitting in the same manner ; none of which circumstances occur in the unmixed inflammatory fever, when it attacks in the same violent manner with high delirium.

But such violent cases are rare, this mixed fever usually beginning with milder symptoms, irregular chilliness, lassitude, confusion of the head, aching of the bones, and disorder of the stomach.

If

* Vide Pringle's Observations, &c. 7th edition, page 75—78.

§ Vide page 309 and page 343.

If the strength and hardness of the pulse induce the physician to order bleeding, the blood generally throws up abundance of inflammatory crust, notwithstanding which, instead of greater and more distinct remissions, which he probably expects from the evacuation, a sudden and dangerous degree of weakness not unfrequently follows ; for in the progress of this fever the pulse is not so steady as in the inflammatory.

This disease is sometimes accompanied at the beginning with costiveness, at other times with a tendency to looseness ; the first case forms a presumption of an inflammatory bias in the disease.

Excessive sickness, bilious vomiting and purging, are often the predominant symptoms at the beginning of this fever ; and when these evacuations are judiciously encouraged and assisted by repeated draughts of mild subacid drinks, and plentiful dilution continued for some time after the evacuations have abated, this treatment alone frequently carries off the fever ;—in my opinion it performs this service oftener than it gets the credit of it.

For as the cholera, a disease consisting of alternate vomiting and purging of bilious matter, is not uncommon at the time of the year when this fever is most apt to prevail ; when the fever is accompanied with bilious vomitings and purgings, and is actually cured by encouraging these evacuations, it is sometimes imagined that the whole of the disease was a cholera, although in reality a formed fever had commenced, of which the vomiting and purging were only symptoms.

It may be said that it is impossible to know that a disease, which suddenly retires, would ever have advanced ; and the cholera is a disease which frequently occurs, independent of any formed fever.

But

But as the cholera often occurs without fever, when a person is seized with a cold fit, followed by heat and other symptoms of fever, although bilious vomiting and purging should accompany or follow these feverish symptoms, the disease should be considered as a fever, and not a cholera.

Besides, when this fever is epidemic, we see frequent instances of its beginning with vomiting and purging; but the patient refusing to encourage by any means those evacuations, they stop of themselves, in which case the fever generally continues, with great sickness and oppression through the remaining course of the disease: Whereas when the patient has the resolution to persevere, in spite of nausea and sickness, in drinking abundantly of mild diluent liquors, and also allows them to be injected by the anus, till the redundant and acrimonious bile is entirely washed from the alimentary canal, the feverish symptoms are more apt to cease along with the vomiting and the purging, the whole disorder terminating in a profuse and universal perspiration.

Chilliness, head-ach, and every indication of a beginning fever, had accompanied the vomiting and purging in the last case as in the first, and there was the same reason to dread the continuation of it in both instances. Since, therefore, it seldom continues when those evacuations are freely promoted than when they are not, it seems highly probable that promoting them by plentiful dilution, is not only the properest treatment of a cholera, but also a likely means of carrying off a fever which begins with the symptoms of a cholera.

And although this method does not succeed in removing every fever that begins with those symptoms, there is the greatest reason to believe that it is always of service, and alleviates or prevents many troublesome symptoms in the course of the fever.

The good effects which antimonial medicines, given at the beginning of this fever, often produce, render this still more probable ; the vomiting, purging and perspiration which they excite (for it is when they excite all the three that they are most successful) often having the same efficacy in removing this fever when it begins without those symptoms, that promoting them by continued dilution has when the fever sets in with them.

When the symptoms of a superabundance of bile appear from the commencement of this fever, there is a great probability that the patient will be peculiarly subject to sickness, oppression, drought, bilious stools; with swelling and tension of the belly, through the course of it.

Those painful and disagreeable symptoms sometimes take place; notwithstanding all the care that can be taken to promote the evacuation of bile from the beginning; but are apt to be more severe, to be attended with gripes, with heat, and sometimes even with excoriation about the fundament, when this is neglected.

Worms are sometimes passed by stool; sometimes they are thrown up by vomiting in the course of this fever, and sometimes escape by the mouth without vomiting, and in such cases the griping and sickness are remarkably obstinate and severe.

Lancisius first gave an opinion, which has been since adopted by Sir John Pringle and Dr. Donald Monro, in their books upon the diseases of the army, that as these animals sometimes lie long in the bowels without creating much uneasiness to persons otherwise well, he supposes that in all who have this symptom, the worms are lodged before the fever begins; and then being annoyed by the increase of heat, and the corruption of the humours in the primæ viæ (consequent on the fever) they begin to move about and struggle to get

get out, and so occasion the disagreeable symptoms above mentioned.

Notwithstanding the respectable authority by which this opinion is supported, I cannot help thinking it more probable that these animals are produced by the effects of the fever, than that they exist previously; and that being seduced and perverted from their original *state of innocence* by the *corruption* of the disease, they then, for the first time, become mischievous wanderers all over the alimentary canal: Which opinion is greatly confirmed by this circumstance; that worms are very seldom found in the bowels of grown-up persons who die of other diseases.

The urine is generally high-coloured and transparent, and rendered in small quantity at the beginning of this fever; in the progress of the disease it assumes a citron colour, or becomes turbid; if the disease takes a favourable turn, it is made in considerable greater quantity, and sometimes (not always) deposits a pale brick-coloured sediment.

The duration of this fever, like that of all fevers, is uncertain; as I am convinced that it is sometimes checked and sometimes entirely removed by assisting spontaneous or exciting artificial evacuations on its first appearance; I am also convinced that its course may be shortened by other means which may be used during its progress: I therefore cannot be surprized at that uncertainty.

As for the ancient and venerable doctrine of critical days, without calling in question the veracity or judgment of those great men, who in other climates, when the mode of living was more simple, and at a period when the practice of medicine was more passive than it is at present, first pointed them out; I have only to say, that what ob-

servations I have been able myself to make, have not taught me to rely upon them.

I therefore look up with admiration at the superior penetration of those who inform us, that they can perceive them take place with wonderful regularity even in this uncertain climate, and in these days of luxury and excess, and notwithstanding the various methods of treating fevers now in use. For even admitting that Nature of herself had a desire of terminating a fever on one day rather than another, and that a few saline draughts, castor boluses, or a little cordial confection, could not much disturb the natural course of things, yet it seems reasonable to expect that such powerful medicines as antimony and Peruvian bark would make a great alteration in the progress and periods of the fever, and put it out of the reach of every eye but that of faith, to discern the critical movements in question. To suppose that these medicines will abridge the fever, without disconcerting the critical periods, is to suppose a great deal.

If it is difficult to point out a regular plan of treatment in diseases whose appearance is more uniform, it must be still more difficult in such a disorder as this, whose remissions announce it of a middle nature between the continued and remittent fever, while another combination of symptoms incline us to think it also of an intermediate kind between the inflammatory and the nervous; and whose Proteus disposition, after displaying the strongest likeness to the former, is apt suddenly to assume the most malignant features of the latter. As bleeding is so beneficial in the one and so hurtful in the other, one of the first and most important points to be decided in our treatment of this mixed fever, is, in what *degree* that evacuation is proper, and in what cases it is proper at all.

We find a very great difference of opinion among medical writers on this important head ; and there are some who first insist at great length upon the necessity of repeated bleedings at the beginning, when the pulse is strong and frequent, warn us, in pathetic terms, of the danger of delay ; because the opportunity of doing good by that evacuation, if neglected, will never return ; and in a subsequent paragraph the prudent author informs us, that however strong the phlogistic diathesis appears to be at the commencement of fevers, yet in many instances it does not form the essential part of the disease, and will not continue through the course of it. We are reminded, that " to diminish the quantity of blood is an easy affair, but to restore that source of strength is tedious and difficult, and intreated to be upon our guard, for perhaps nervous debility and putrefescency are lurking behind the inflammatory symptoms, ready to start forth and ravish the patient out of our hands as soon as he has lost a little blood."

Such admonitions are no doubt well meant, and deserve our gratitude, as much as the commander in chief did that of the officer whom he detached upon a hazardous expedition, with pressing orders to hasten his march and attack the enemy as soon as possible, taking care at the same time not to *precipitate* things in the least, but to *wait patiently* for a proper opportunity ; as the enemy, on their part, were extremely well disposed to destroy him and his whole army, if they could. Admonitions to avoid the dangers by which we seem equally pressed, of bleeding or letting it alone, are of little service, unless they are accompanied with such particular directions as may assist our judgment in determining on the one measure or the other.

The state of the weather and season of the year will assist a little in deciding this point, because the nature of the fever will more probably incline to what is called the putrid kind in autumn after a very hot summer, than during the frosts of winter or the piercing winds of the spring. Bleeding therefore will more probably be requisite in the one season than in the other, and may be ventured in greater quantity, although the symptoms should be nearly the same.

When the patient is costive, there is more reason to believe the fever to be of an inflammatory nature than when his body is loose.

When diseases of a nervous malignant tendency prevail, or have lately visited a person in a fever of that species, or when the patient is lodged in an hospital, we ought to be more cautious of bleeding at all, and more moderate in the quantity to be taken, than if no such distempers were epidemic, or than if the patient had not had any intercourse with a person from whom he could receive the contagion, or than if he breathed an atmosphere more free from human effluvia than is to be found in hospitals.

The same caution and moderation are more requisite with patients whose natural constitution is weakly, than with those who are robust and plethoric.

Due weight being allowed to all these circumstances, we shall be enabled to determine with still more accuracy upon the propriety of venesection, by attentively considering the symptoms themselves; and when we find those which indicate the operation blended with those which forbid it, our decision will depend upon which preponderate.

Should a robust man, for example, complain of a sensation of cold, with irregular shiverings, succeed-

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ed by great heat, a strong and rapid pulse, with pains in the loins and head, and is at the same time costive, it will be expedient to let some blood previous to giving an emetic or using any medicine, although the disease occurs in autumn, and the patient has a yellowish tinge in his eyes, a bitter taste in his mouth, and much nausea. But if the cold fit is preceded by long continued lassitude, if it amounts only to a feeble sense of cold or irregular chilliness, if attended with an open belly, and if the patient seems dejected, it will be best to waive the bleeding, although the skin should be very hot and the pulse pretty full and strong.

The two circumstances which deserve to have the greatest weight in deciding this question, are the nature of the prevailing epidemic, if any prevails, and the constitution of the patient ; for if the last is not exceedingly strong and plethoric indeed, and the pulse strong and full in proportion, it will be safest to omit bleeding when nervous malignant fevers are frequent in the neighbourhood. But if the strength of the patient and the symptoms of inflammation determine us to risk this evacuation, it should be in a much more moderate degree than we might have thought expedient, had no such epidemics reigned at the time.

After all the accuracy that can be displayed in pointing out the proper treatment in this important article, cases occur that puzzle physicians of the greatest natural sagacity and most improved experience—and perhaps puzzle those of this description only ; for there are some to whom no extension of practice can give experience, and to whose self-sufficiency no case, however complicated with opposing symptoms, seems intricate.

After bleeding, or having decided that the evacuation is not necessary, the measure to be taken in

the next place admits of no doubt. The stomach and whole length of the alimentary canal should be emptied.

The remains of food, the redundancy of bile and other secretions, with the wind and fæces there accumulated, have, doubtless, considerable effect in aggravating every symptom at the beginning of the fever, and we sometimes have the satisfaction of finding the fever entirely removed in consequence of the means taken to cleanse the first passages.

If there is a considerable degree of nausea, it will be to no purpose to begin with a purgative; because in this situation the patient would in all probability throw it up. It will be best, therefore, to begin by ordering a laxative clyster; and after the operation of that medicine is over, to give an emetic.

The first will wash the hardened fæces from the rectum, and render the operation of the second more effectual. It will be best not to give the emetic at the time of the accession; but rather wait till that seems to abate.

Two or three grains of tartar emetic dissolved in a little water will generally prove a sufficient dose, and in this fever is more efficacious than ipecacuanha, which in the dysentery is preferable to tartar emetic. The vomiting, when it begins, must be promoted by drinking very plentifully of warm water; and in case the first dose should not operate within half an hour after it is taken, three grains more may be dissolved in a quart of warm water; and half a pint of this solution may be drank every quarter of an hour till it has had the desired effect.

Exhibited in this manner, the antimonial generally proves both emetic and purgative, effectually cleansing the whole intestinal canal, and often producing

ducing such a determination to the surface, as brings on an universal diaphoresis, and removes the constriction of the extreme vessels, all of which effects united, sometimes carry off the fever.

As there is reason to think that much acrimonious bile is sometimes accumulated in the gall-bladder and flexure of the duodenum, and much rancid matter retained in the bowels at the beginning of this fever, it follows of course that such accumulations must aggravate every symptom of the fever; and it cannot be doubted that throwing such a load out of the body must have considerable effect in cooling and relieving the oppressed patient; but then it is urged, that this redundancy and accumulation of bile and other acrimonious matter being the effect and not the cause of the fever, the removal of it, although it do produce an abatement of the symptoms, cannot possibly remove the fever.

However plausible this may seem, I am fully convinced from observation, that vomits, and particularly those of emetic tartar, are often of great service, independent of their effect of unloading the stomach, sometimes even when the stomach seems to have been quite clean, and when nothing has been thrown up besides the emetic itself and the water.

The action of vomiting is violent and convulsive; the retchings, which continue after the stomach itself is quite empty, are still more so: They produce a copious and universal perspiration; they affect every vessel of the body; the stomach has a stronger sympathy than any other organ, the heart excepted, with the whole body; and I have not a doubt that emetic tartar, exhibited in the manner above mentioned, sometimes entirely shakes off fevers. I shall not make any farther attempt to ex-

plain how; such an attempt would be as superfluous as it might be unsuccessful; for those who expect nothing from this medicine but cleansing the first passages, and preventing noxious absorption, may think the antimonial necessary for those purposes at least; and if, upon trial, they find that it has another salutary effect besides that which they expected, the good resulting to the patient will be deemed, it is to be hoped, a sufficient compensation for the refutation of their argument.

If at the beginning of the fever the patient has a violent vomiting, it will not be proper to give either tartar emetic or ipecacoanha, but rather to promote the spontaneous vomiting by plentiful and repeated draughts of warm water, until the stomach is completely cleansed, and the vomiting ceases; for vomiting is the cure of vomiting in all cases, except when it proceeds from an inflammation, or some other disease of the *substance* of the stomach.

When the vomiting is accompanied with a purging, as is often the case, plentiful drinking, without any cathartic medicine, will be sufficient to promote this evacuation as well as the other; but if there is no natural looseness, or if the tartar emetic, the ipecacoanha, James' powder, or whatever may have been given to excite vomiting, operates as a vomit only, without emptying the bowels also, it will be highly expedient to give the patient an injection a short time after the operation of the emetic, and a cooling purgative the following day.

But if at the beginning of the fever there is neither a vomiting nor a great degree of nausea, it will be most expedient to give, previous to the emetic, and immediately after the bleeding (if bleeding is at all necessary) a medicine that we are certain will directly prove cathartic; for it is of great importance to cleanse the *whole* alimentary canal, and prevent acrid absorptions

absorptions, as soon as we possibly can ; and in this case the tartar emetic may be given the day after the operation of this purgative.

In short, the first thing to be done on the attack of the fever, is to bleed, if bleeding be thought proper ; after which, in case of sickness or much nausea, to give an emetic, and if this emetic does not prove also purgative, an injection should be given the same evening to remove indurated fæces, and a cooling purgative next day to cleanse the whole canal ; but when there is little or no nausea, or other symptom of a foul stomach, the cooling purgative may be given previous to the emetic or any antimonial medicine.

It happens not unfrequently that these evacuations, without carrying the fever away entirely, produce some abatement, and a more evident distinct remission than was before. The more distinct the remissions are, the greater probability is there of putting an end to the fever. However violent the symptoms during the exacerbation may be, the chance of this is greater when the remission is tolerably evident, even although the accession be violent, than when the last is more mild and the remission less obvious ; because in the former case the use of the Peruvian bark is safer and more certain. But if the opportunity of carrying off the fever, which such remissions afford, is not improved, they often become less distinct, and the fever of course more dangerous. Six drachms of the powder of bark for an adult, or as near that quantity as the patient can be prevailed on to take, should be given during the remission ; and as this is generally short, the doses must be large, and repeated frequently, to make sure of giving that quantity during the interval : If this succeeds, the same medicine should be continued, in smaller quantity, for several days.

There

There is no danger in making this trial by the bark when there is little or no inflammatory dia-thesis, which there is great reason to believe is the case when the febrile symptoms abate considerably, and when the remission becomes more distinct immediately after the first evacuations.

It was long an almost universal opinion, and is still the opinion of many, that bark cannot safely be given in any fevers but the intermittent, and not in them till the intermission is perfect. In un-formed intermittents, therefore, and the remitting fevers now under consideration, the practice was to give neutral salts and saline mixtures after the first evacuations, in the expectation that by the continuing these medicines the *remissions* would gradually become *complete intermissions*, and then the bark might be given with safety.

But this expectation was so often disappointed, and the remissions, instead of becoming longer and more distinct during this suspension of the bark, were so apt to disappear altogether, and the fever to advance with a less interrupted pace and more violent symptoms, that some practitioners, on whose minds long-established opinions had less influence than ordinary, ventured to give the bark without waiting for such a perfect intermission as the common practice prescribed; and their boldness, in many instances, was crowned with success.

Mr. Cleghorn, formerly surgeon to a regiment at Minorca, and afterwards lecturer in anatomy in the university of Dublin, by his observations on the epidemical diseases of that island, contributed greatly to the removal of this prejudice. That gentleman displays in his book* great learning, a most acute judgment,

* Vide Observations on the Epidemical Diseases of Minorca, by George Cleghorn, Surgeon to General Ofarrel's regiment.

ment, and much liberality of mind ; he candidly acknowledges the errors of his early practice ; and to prevent others from falling into the same, seems to have been his chief inducement for publishing ; and there is good reason to believe that his publication has saved many lives. His observations have been confirmed by those of several judicious practitioners who have appeared since. But he whose penetration first overcomes an hurtful prejudice is entitled to the first praise.

The experience of candid and judicious practitioners *alone* ought to have weight in determining the propriety or impropriety of this method, which can neither be strengthened nor weakened by any enquiry into the manner in which the bark acts, whether it is by a tonic power, acting on the nerves of the stomach, and communicated by them to the whole body, or whether it produces its effects in a slower manner by its operation on the fluids : Such enquiries are far more curious than useful ; but were they more useful than curious, the investigation would be equally fruitless ; and those who hesitate to give the bark till it is clearly made out in what manner it performs its effects, will, in all human probability, continue hesitating to the end of their lives.

It is not unusual for those who seem to have the highest opinion of the virtues of Peruvian bark to give it in conjunction with snake-root, chamomile-flowers, and other bitters, with a view to render it still more efficacious.

But universal experience has established the Peruvian bark as the most powerful febrifuge of all the class of bitters, or indeed of any other class of medicines ; yet sometimes it fails, merely because the patient's stomach cannot bear the due quantity for producing the desired effect ;—if we intermingle any other bitter, we must necessarily withdraw a proportional

tional quantity of bark, that is to say, we must substitute a certain quantity of a weaker remedy in the place of a stronger, which to a man of plain unrefined understanding would not appear the most probable method of overcoming a disease—experience having also proved that the bark sits as easy upon the stomach as any bitter, the giving any other bitter, over and above, will hardly be supposed the best way of enabling the stomach to retain a greater quantity of bark. Sydenham says, “ Neque enim remediorum pompæ libuit indulgere ; cum sane, qui aliquid *corticis* adjiciunt, præter vehiculum, eidem in ventriculum transmittendo necessarium, aut ex ignorantia peccant, ut mihi videtur, aut dolo malo.”

This observation is certainly too severe ; yet however proper combinations may be on other occasions, they seem improper on this, where the view is solely to give as much bark during a remission of the fever, as will afford the greatest probability of preventing its return. Indeed combinations, too often, while they render a prescription more pompous, make it less efficacious.

There is no doubt that the danger of giving the bark in this fever, has been greatly magnified ; the notion, in particular, that it checks the secretions, and suppresses beneficial discharges, has probably arisen from fallacious reasoning *à priori*; for the experience of the most accurate observers teaches us, that although this medicine has a powerful effect in stopping those partial colliquative sweats, which are at once the effect and the cause of weakness, yet it often promotes warm, universal and critical perspiration. The same experience shews, that the opinion of its having a tendency to form obstructions in the liver, and other abdominal viscera, and lay a foundation for future dropsies, is equally ill-founded ; and that various other

other bad effects, the real offspring of disease, but which the bark, had it been given in time, would have prevented, have been unjustly imputed to the medicine, merely because it had not the same effect when it was given too late.

To administer the bark indeed, while there are strong symptoms of an inflammatory disposition, and little or no remission, is dangerous ; and to throw it into the stomach and bowels, while they are replete with bilious or acrimonious fluids, would be ineffectual ; it is therefore sometimes necessary to abate the violence of the first by bleeding, and obviate the second by cleansing the alimentary canal, that this powerful medicine may not do harm, by augmenting the already too forcible action of the heart and arteries in the one case ; and that its virtues may not be drowned by an accumulated flood of coluvies in the other *.

But if, notwithstanding those evacuations, the fever continues with augmenting force and shortening remissions, so that the bark cannot with propriety be given, or having been given, produces no abatement of the disease : If, on the contrary, after its use the tongue becomes parched and the skin drier and more hot, the bark must be discontinued ; and the best we can do is to return to the antimonials, but in such small doses, as without exciting vomiting will give a determination of fluids to the skin, promote perspiration, and keep the body open.

Small doses of James' powder I have generally found to act in this way with as much certainty and mildness

* In hot climates it is not so requisite, nor indeed so safe, to try the usual means of bringing this disease to more distinct remissions, or at least we dare not risk the trial so long as in colder countries ; because in the former every hour of delay threatens that fatal debility which renders all medicine useless. And the very circumstance which may prompt us to use the bark more readily, must make us use bleeding more reluctantly ; for excessive heat augments the debilitating tendency of the fever.

mildness as any form in which antimony can be exhibited, giving at the same time repeated doses of Rive-rius' anti-emetic mixture. This medicine, *when taken in the moment of effervescence*, is peculiarly grateful and refreshing to the parched mouth and squeamish stomach of the patient, and for these and other reasons is probably *then* most beneficial. Some practitioners have occasionally given a solution of the alkaline salt, and immediately above it the proper quantity of lemon juice, that the effervescence might take place entirely in the stomach; but the alkaline solution is so very nauseous that few patients can swallow it: To obviate this, others have thought of giving the salt in a balsus;—but who can say, that immediately on the alkaline salt entering the stomach, it may not meet with something there which may instantly change its nature, and prevent it from effervesing with the lemon juice?

The antimonial alteratives, the saline mixtures, in the usual way, or neutral medicines in any other form, are therefore to be preferred, and will be rendered more effectual by keeping the patient's bed-chamber moderately cool, having it always well ventilated and refreshed with vinegar; and by encouraging the patient to drink abundantly of cooling subacid drinks, as lemonade, imperial*, toast and water, acidulated with spirit of vitriol, or whatever other drink of the same nature is most agreeable to his taste;—his taste will very seldom direct him wrong.

In the last century, and that immediately preceding it, the minds of mankind seem to have been obscured with ideas equally gloomy in religion and in medicine; every

* The cooling aperient qualities and acid taste of cream of tar-
tar, of which this liquor is composed, render it a very proper and
agreeable addition to many of the patient's drinks.

every thing pleasing was thought sinful ; and by many enthusiasts, what gives the highest pleasure was considered as the greatest sin. The physicians seem to have adopted the prevailing sentiment of the times, and to have applied it to the practice of physic ; they condemned every thing that was agreeable to a sick person's taste or feelings, and declared it noxious to his constitution, and the more noxious in proportion as it was agreeable. In many instances they treated their patients, as if they had been persuaded that the most effectual way to restore health, was to prescribe what was most repugnant to his taste. If he complained of heat, additional bed-clothes were heaped upon him to force a sweat ; if, half stifled, he begged for a little fresh air, the bed curtains were drawn closer, because cold ought to be most guarded against when the body is hottest ; and if he complained of thirst, and entreated for a draught of cool water, he was presented with a *draught* from the apothecary's shop, well impregnated with spiceries.

How many fevers would have terminated favourably, had the pleadings of Nature been listened to, and the wishes of the patients gratified, which by this horrid treatment have degenerated into petechial malignity ! How many victims, since the period above alluded to, have been sacrificed to the pride and obstinacy of mistaken science, dazzled by the meteors of theory, and despising the humble path of experience pointed out by the earliest physicians !

The prejudices in favour of sudorifics, and the hot regimen in fevers, is now however pretty much removed ; irresistible experiment obliges the haughtiest doctor to acknowledge, that the best way of cooling a human body heated by fever, is that which cools every other hot body, and would naturally occur to the most untutored mind, which *proud science never taught*

to stray, namely, the admission of a cool atmosphere*.

It seems equally obvious, that the most effectual way of allaying intense thirst, is abundant drinking of quenching liquids ; and that the proper aliment for a feverish and capricious stomach, is not that which it loaths, as it does every kind and every preparation of animal food, but that which it longs for, which is the case with almost all sorts of mild, juicy, ripe fruit ; these spread a refreshing moisture over the parched tongue and throat of the languid patient, moderate the ardour of his thirst, dilute and cool the heat of his juices, promote urine, and tend to keep the belly open.

The last is a point of great importance to this fever, where we often find a tendency to new accumulations in the intestines, as soon as the old are removed, or of bilious redundancy in the gall-bladder and its ducts ; the first may be suspected from the patient's becoming costive, and seeming more oppressed and restless ; the second, by a fulness and uneasy sensation in the region of the liver. When these happen, therefore, and the subacid drinks, ripe fruits, and alterative doses of tartar emetic, assisted by emollient clysters, are not sufficient to prevent them, it is absolutely necessary to repeat the purgatives ; which may consist of combinations of senna with soluble tartar, cream of tartar, manna, or tamarinds, of some of the latter without the senna, of rhubarb with sal polychrest, or a simple solution of sal Glauberi, Repullensis, or of the sal catharticus amarus in water. The last I have always found a certain, easy, effectual and expeditious purgative.

With

* Although it is highly proper that the chamber should be well ventilated and cool, it need hardly be added, that the patient's body must not be exposed to cold too suddenly ; nor ought he to lie or sit in a draught of air.

With respect to the particular cathartic that should be used, this will in some measure depend on the constitution, taste, or even prejudices of the patient, and other circumstances : Wherever there is a considerable choice of medicines of the same nature, and nearly of the same powers, practitioners always have been, and always will be, of different opinions : Accidental events, in the course of his own particular experience, may lead a physician to prefer one medicine to all of the same class, though all perhaps are equal in virtue to his favourite ; he will be still more apt to conceive an affection for a combination of two or three of the same class together, if he imagines that he himself is the original combiner ; he will of course order and recommend this combination on every occasion where a purgative is needed, and as he seldom or never orders any other, he may safely swear that he finds none of equal efficacy. One physician giving a great preference to a combination of his own invention, is seldom found to be a prevailing reason with his brethren for adopting it *. It is fortunate, however, that all judicious practitioners agree in recommending only such mild cathartics as those above mentioned, which perform their office easily, and without griping or otherwise agitating the patient.

After a general idea of a disease is given, and the nature of the treatment it requires pointed out, particular forms of prescription, and the proportions of the combined ingredients, must be left to the judgment of the attending physician, who alone can adapt it to the constitution and circumstances of the patient.

* Those, therefore, who desire that it should come into general use, and appear in the prescriptions of others, had best not add the emphatic word *noster* to the name of the medicine in their own, as that seems (though certainly the reason is not a good one) to incline their fastidious brethren to reject it.

Medical forms of prescription are temporary and transient, they vary with other fashions* : Prescriptions complicated with a multiplicity of materials were greatly the fashion formerly ; a veneration for antiquity still preserves in our pharmacopœias some of a most extravagant exuberance ; the vast host of whose opposing ingredients, like the earth-born soldiers of Cadmus, mutually destroy each other. In general, however, complicated prescriptions are now disapproved of, and far simpler, more certain, and it is to be hoped more efficacious forms of prescription are the present mode.

A repetition of the mildest purgatives has been objected to, from an apprehension of their diminishing the patient's strength ; but it must be remembered, that nothing is more exhausting than the heat and restlessness occasioned by acrimonious absorption. When an accumulation of bile and other matter in the bowels therefore is indicated, by a swelling and tension of the belly, and by other symptoms, the purgative which removes these impurities from the first passages, proves in effect a strengthener, and not a weakener. Besides, this accumulation of impurities is apt to burst forth in a violent diarrhœa, which might not be easily checked, even when the patient's strength

* It may seem extravagant to say there is a fashion even in diseases ; yet I am much mistaken if the leaders of fashion in London, as well as in Paris, do not sometimes give a *ton* to particular complaints, which soon renders them epidemic.—When the fair Queen of France, or the Duchess of _____, catch a cold, and are told by their physicians, that the distemper is bilious or nervous, or any other medical name, which makes a plain matter mysterious ; they repeat the terms, are universally sympathised with, and *bilious* and *nervous* complaints become as universal as *fashions* and *feathers*.

In the reign of Lewis XIV. after the King's distemper was announced, fistulas, we are told, became much the mode among the courtiers at Versailles.

strength seemed sinking under it, but which may be prevented by a well-timed purgative.

The calm sleep which the patient sometimes enjoys immediately after the operation of a laxative, is a proof that the preceding restlessness was owing to this accumulation.

When the tension is great, and the belly sore to the touch, emollient fomentations give ease, and emollient clysters are serviceable, both as internal fomentations, and by hastening the operation of the laxative.

After a proper purgative has had its full effect, giving fifteen grains of the powder of Columbo root, rubbed up with double the quantity of tartarum vitriolatum, nitrum vitriolatum, tartarum solubile, or sal diureticus, mixed with some of the simple distilled waters, and given two or three times a day in the form of a draught, has often a good effect in preventing costiveness and the swelling of the belly, and in promoting the secretion of urine. The powder of Columbo is gently laxative, and agreeably bitter; it has a tendency to remove nausea, and can sometimes be taken without reluctance, when other medicines of the same class create disgust; and may either be given with some of the neutral salts above mentioned, or in a saline draught.

If the patient continue restless after the bowels have been thoroughly emptied, a gentle anodyne may be ventured upon; that combination of opium, ipecacuanha, and neutral salt, which is known by the name of Dover's powders*, is the safest I know. Two or three grains may be given in a saline draught every

* As there are various receipts for Dover's powders, in some of which the proportion of opium is very different from what it is in others, it may be proper to mention, that I allude to that which has been admitted into the last edition of the Edinburgh Dispensatory.

two hours till it has effect, which often happens after the first or second dose. This medicine generally produces perspiration as well as sleep ; some of the bad effects of which opium is accused, when given alone, are prevented when it is qualified with the emetic and neutral salt. It still retains however the quality of producing costiveness ; and therefore this medicine ought not to be given where there are symptoms of bilious redundancy, except immediately after a purgative ; and not then, unless the patient has been for a considerable time harrassed with want of sleep ; neither must it be continued beyond three or four such doses. Towards the end of the fever, when the inflammatory symptoms have disappeared, and the patient is no longer disturbed with too great a flow of bile into the bowels, this opiate, in case of restlessness, may be given with more freedom.

When by the continued use of the antimonial alteratives, saline mixtures, and the most agreeable acidulated drinks, and by the exhibition of a mild purgative, as often as there is reason to suspect a constipation of impurities in the bowels, the phlogistic diathesis gives way, and the force of the fever seems to abate ; if at the same time a warm diaphoresis appears on every part of the body ; if the mouth moistens ; if the urine is rendered in greater quantity, and lets fall a sediment ; if the pulse becomes soft and slow, and the skin cool after the sweat ceases, the fever is at an end, and the bark is not necessary, unless during the state of convalescence it is thought proper to administer it as a strengthener.

But

When a liquid form is preferred to the powder, liquid laudanum, tincture of ipecacuanha, and vitriolated tartar (observing equivalent proportions) may be added to a saline draught, or given in any other vehicle.

But if, without these decisive symptoms, there is only a considerable remission, while the remaining heat of the skin and quickness of the pulse indicate that some degree of the fever still lurks in the constitution, it will be prudent to seize the opportunity this remission presents, to give from half an ounce to six drachms of the bark, the effect of which will probably be either to prevent another accession of the fever, or prevent that prostration of strength, and those dangerous symptoms, which sometimes appear in the progress of this disease.

It undoubtedly requires the most serious reflection, and a just weighing of every circumstance, on the part of the physician, to decide, in many cases, whether it will be best to delay giving the bark, and to continue the other medicines, in the hope of a greater abatement of the fever; or to profit immediately by the remission which presents itself, lest a sudden and insuperable weakness should disable the patient from taking it afterwards in due quantity. No absolutely certain rule can be given in this or many other situations which occur in medicine; but it may be received as a maxim, which in general will be found just, that the danger of giving the bark too late in this fever, is greater than that of giving it too soon; and that the danger of bleeding too much, is greater than that of not bleeding at all.

It was observed above, that we might be determined in some measure by the nature of the reigning epidemic, with respect to bleeding at the beginning of this fever.—The general course which the disease holds at any particular season, may also determine us with regard to the period at which we should begin to give the bark. For if when this fever prevails, we observe that while the symptoms are no way alarming, and while

we use the common means of promoting more distinct remissions, the patients are apt to be suddenly seized with excessive weakness and increased confusion in the head; it will then be proper, in future cases, to give the bark earlier, that we may obviate the dangerous debility we have reason to dread; for having observed this in several cases, we have cause to believe that such is the general bent of the fever. Indeed it commonly happens that epidemic diseases are treated more successfully after having continued for some time, than when they first appear, on this account, because we become acquainted with the various changes of the diseases, and by that means are sometimes enabled to prevent the effects of the most troublesome symptoms.

If a swelling and tension of the belly, and other symptoms of accumulated impurities, have taken place before the physician has been called; and if the pulse is weak and sinking, as is generally the case when this swelling appears, a single dose of rhubarb and sal polychrest, or some other mild purgative, given in two or three spoonfuls of simple cinnamon water, is the only preparation that can be waited for; immediately after the operation of which, the bark should be given.

Indeed at any period of the fever, if the patient unexpectedly becomes giddy, feeble and languid, the bark must directly be had recourse to, as the most powerful means yet known to obviate the melancholy train of symptoms, of which a sudden deprivation of strength is often the foreboder; but when, in spite of all our efforts, those take place, the fever is no longer of the mixed kind, but has degenerated into a true nervous, putrid, or malignant fever, the disease of which we now mean to treat.

IV.

NERVOUS FEVER.

THE fevers already described, and indeed every disease attended with any considerable degree of feverishness, affect, in some measure, the nervous system; because a fever occasions a general disturbance of the whole animal *economy*, of which the nervous system is a part. But in this particular fever the nervous system is more immediately and more violently affected than in others.

When a fever is once produced, from whatever cause it has originated, by continuing long to operate on the body, it at length occasions all the symptoms which appear in the nervous or malignant fever.

A skilful physician therefore, called to visit a patient when in the last stage of a tedious common fever, could not, with certainty, know whether it had begun with the usual symptoms which attend the first stage of the inflammatory or the remitting fevers, or if it had appeared to be of the nervous kind from the beginning. Indeed, such knowledge would be of little importance to himself or the patient, because his business is to treat the disease, not according to the symptoms that have been, but according to those which actually exist.

This fever, like all others, has been described by different authors under various names: The nervous fever, the gaol fever, the hospital fever, the ship fe-

ver, the petechial fever, the putrid fever, and the malignant fever.

The first appellation it receives from its attacking the sensorium and nerves more immediately and more violently than other fevers generally do: The second, third and fourth, from its being apt to arise in gaols, hospitals and ships, where numbers of men are often obliged to be crowded together, and where sufficient care is not always taken to have them well ventilated and cleansed; the fifth from certain spots which sometimes appear on the skin of patients labouring under this disease; the sixth from a putrid state or tendency, supposed to take place in the blood and juices; and the last from the dangerous nature and malignity of the disease,

Of all those epithets, that of putrid, which is by much the most universal, seems, in the eyes of some, the most improper, as it implies that the same change takes place in the blood during this fever, that happens to animal substances after death, when they are in a state of putrefaction.

Some physiologists have imagined that this putrescence is the cause, others that it is the effect of the fever now in question.

But either as the cause or effect, the established opinion was, that the blood acquires a state of putrescence, or becomes quite putrid, during this fever.

Medical opinions which are deep-rooted by time, and sanctified by authority, are received at last as unquestionable truths, which it would be folly to doubt, and presumption to investigate—the bulk of mankind are too timid for the one, and too lazy for the other.

But there are some who are so much struck with the number of absurdities which have been handed down to us through ages, that their minds seem little

little disposed to adopt any opinion merely on account of its antiquity.

Such men endeavour to bring all opinions to the test of experiment and strict observation ; and if they are found not to stand those tests, reject them from their creed without further ceremony, although they should be sanctified by all the medical apostles who have written since the days of Hippocrates.

These unbelievers assert that mankind are tenacious of opinions, when once adopted, in proportion as they are extraordinary, disagreeable and incredible ; and quote the prevalency of this notion of the blood becoming putrid in certain diseases, as an illustration of this remark.

“ That our bodies,” say they, “ return to corruption after death, is no very pleasant recollection ; “ but that our blood corrupts while it circulates in “ our veins, is still more mortifying ; but fortunately “ it is as improbable as it is unpleasant.

“ It might naturally have been imagined,” continue they, “ that nothing of less force than the evidence of the senses, the actually seeing the plainest and most unequivocal marks of putrefaction in the blood, and such appearances in the urine and other humours as plainly indicated their derivation from a corrupted source, could have constrained mankind into an opinion to which they must naturally have such an aversion.”

To all this the supporters of the doctrine of putrefaction answer, “ That *it is* to the plainest and most unequivocal marks, and to the evidence of their senses, that they owe their conviction : . That the putrid state of the blood and juices in this disease is evinced by

“ A loathing of animal food, vomiting, thirst, and a desire of acids.

“ By

" By the cadaverous smell of the body, and fetor
" of the urine and perspiration.

" By the blood which is taken from the veins
" not coagulating as usual.

" By certain spots or marks called petechiae or vi-
" bices, owing, as they assert, to effusions of blood
" below the cuticle.

" And by hemorrhage from various parts."

The sceptics urge in reply to those instances, " That
" all supporters of a system, especially one long es-
" tablished, in the belief of which they have been bred
" from their youth, and which some of them have
" taught from the professorial chair, are apt to dwell
" with complacency on every circumstance which
" seems to favour it; and sometimes they do not scrup-
" ple to bend to the same side those circumstances
" which have a natural bias the contrary way.

" That to this disposition alone we must refer the
" bold assertions we find in medical books, that the
" blood, and all the excretions, display evident marks
" of putridity and corruption.

" That a loathing of animal food, vomiting, thirst,
" and desire of acids, are common in other fevers,
" and in many diseases which are not even suspe-
" ed of being of a putrid nature. With respect
" to the cadaverous smell of the body, and fetor
" of the urine and perspiration, these are exagger-
" ated expressions. The natural smell of dis-
" eased bodies is certainly not agreeable; but if
" that circumstance is to be taken as a proof of
" putrefaction, every disease almost to which men
" are liable may be called putrid; but in com-
" plaints which do not labour under so bad a name,
" the same smell is expressed by the gentle term
" of sickly, which in diseases whose names im-
" press the idea of corruption, are stigmatized with
" grosser epithets. But every one who has been
" accustomed

" accustomed to the examination of diseased and
" of dead bodies, must be sensible that the term
" of putrid, which belongs to the one, never can
" be used with propriety to the other."

They desire us to take the trouble of considering what putrefaction really is.

" That all animal bodies, soon after death, begin to putrify, that is, their constituent parts separate, and new compounds are formed ; during which process a peculiar fetid vapour arises, and a large quantity of fixed air is let loose.

" That any part of the solid substance, blood, or humours of an animal, cut off or separated from the body, exhibit the same phenomena."

They acknowledge, " that when any part of the body is so severely injured, whether by external violence or internal disease, that there no longer is either sensation or circulation in that part, it then no longer belongs to the body, but is in the state of a part separated, distinct and dead, and of course is subject to putrefaction, like any other separated part ; but no such thing ever takes place in a living part, or in the circulating fluids."

They likewise acknowledge, " that the contents of the intestines when long retained, and particularly the redundancy of bile which is sometimes poured into their cavity during this fever, become uncommonly fetid and acrimonious, and often produce severe gripes, swelling and tension of the belly, and sharp corrosive stools of a blackish colour. But although a complete putrefaction should take place in the intestinal contents, this circumstance could not affect the argument ; for they certainly must be considered as extraneous matter, and no part of the organized body.

" For

" For they add, that in good health the gastric
 " juice, which is probably the most powerful of
 " antiseptics, prevents any degree of putrescence
 " in the aliment ; but when the powers of the animal
 " œconomy are greatly debilitated and otherwise af-
 " fected by disease, it is probable that the gastric
 " juice may either become weaker in quality, or be
 " separated in such small quantity as not to resist the
 " putrescent tendency of the aliment or of the bile
 " when extravasated. We find that during the conti-
 " nuance of fever there is a total want of appetite ; the
 " constriction which takes place on the extreme
 " vessels of the external surface of the body, we
 " cannot doubt, affects in the same manner the
 " vessels of all the internal surfaces, and among
 " others those of the stomach, the effect of which
 " may be a diminished secretion of the gastric juice ;
 " for it is agreeable to the wisdom of Nature to
 " suppose that little of this juice will be secreted
 " at a period when there is little use for it ; or
 " perhaps in the same manner that the sight or
 " thoughts of food excite the secretion of saliva,
 " so appetite may excite the secretion of the gastric
 " juice ; of course, when there is no appetite, there
 " will be less secreted."

These controvertists farther insist, " that, how-
 " ever improper the practice may be, blood often
 " has been taken from patients during the course
 " of malignant fevers ; and they assert that it has
 " not been found in the state which the supporters
 " of the blood's putrescence represent ; they declare
 " that no particular fetor is discoverable in this
 " blood ; that it coagulates sometimes with a greater,
 " sometimes with a smaller degree of firmness, but
 " always in some degree ; and that its coagulating
 " at all is a proof that it is not putrid.

" That

" That the urine, so far from being peculiarly fetid, often suffers less change in this fever than in most other diseases..

" That the cold clammy sweats are no proofs of putrefaction.

" And that accidents which sometimes occur towards the end of this fever, of particular parts of the body mortifying, are to be imputed to the weakness of the general circulation, and to the pressure, which entirely stops the circulation in these parts, when the body remains long in the same situation ; for these accidents happen in other cases, as in dropsies, where the body is greatly weakened, and remains too long in the same posture, and in diseases whose causes are not thought to arise from any putrescency of the fluids, as well as in those which are.

" That the petechiae and vibices, which have been thought strong and irresistible demonstrations of the dissolved and putrid state of the blood, are by no means to be considered as such ; because the whole force of these demonstrations depends upon an assumption that those spots are owing to the blood's being so dissolved by putrefaction as to pass through the exhaling arteries, which it will be difficult to prove, and to which opinion there are strong objections ; for if the blood were so much dissolved as to pass through these capillary vessels, we might naturally expect hemorrhages into all the cavities of the body as often as there are petechiae ; whereas those spots often appear when there are no hemorrhages ; and when they happen in the putrid fever, which is very seldom the case, it is only from the nose and in the cavity of the intestines ; and besides, if the blood was reduced to such a state of tenuity as to pass out of the extremities

" tremities of the exhaling arteries, and diffuse it-
" self under the cuticle, one should think it would
" first fill all the lymphatic arteries, and not ap-
" pear like a few flea-bites, but give a purple tint
" to the whites of the eyes and the whole surface
" of the body."

And they conclude their argument by observing,
" that if the fluids were really corrupted in the
" course of this fever, the bodies of all who die
" of it would shew stronger and more rapid signs
" of corruption than other dead bodies. They
" roundly assert, however, that the contrary of this
" is the fact ; and, for the truth of their assertion,
" they appeal to those who have the most frequent
" opportunities of observing and examining dead
" bodies.

" To the same umpires they appeal for the truth
" of this other assertion, that the bodies of those
" who die of what are called putrid fevers, are
" longer before they undergo real putrefaction than
" of those who die of other diseases, or who die in
" perfect health by violence."

Whatever change, therefore, the fluids undergo
in the diseases in question, they declare it must be
something very different from putrefaction.

But, as it frequently happens in controversy, the supporters of the established doctrine, so far from being convinced by these arguments, seem to cling with warmer zeal to the ancient faith, in proportion as they feel themselves pushed by the reasoning of the reformers, asserting that the animal fluids not only are corrupted during the course of putrid diseases, but that, independent of any disease, in the most perfect health, the same putrescent tendency exists in the blood, which has a natural and constant bias to run into corruption ; and the evidence of the nurse, mentioned on a former occasion, is called in confirmation of this.

" Let

" Let her fast," say they, " for fifteen or twenty hours, and her milk, which before was white, thin and grateful, becomes yellow, thick, and disagreeable ; or let any person in good health be deprived of aliment, and the salts in his blood will become more and more acrimonious, till putrefaction and death ensue." And some eminent writers have gone the length of declaring, that a diet, consisting merely of flesh, fish, spices, and water, will very soon bring on a putrid fever.

Here the sceptic exclaims, " this indeed is filling the chalice of human wretchedness to the brim : At this rate the whole life of man is a continued state of corruption, in a corporeal as well as a spiritual sense : We are not only born in sin and brought forth in iniquity, but we are also born in a putrid fever, and brought forth in an hospital of incurables, where the diseases grow every day more inveterate, and of which all the patients die at last."

But whatever force there may be in the general opinion of the putrescent tendency of the fluids, these illustrations seem not to have a great deal. An alteration, it is said, takes place in the milk of nurses, in consequence of too long fasting—unquestionably : How can it be otherwise ? The source from whence the milk is separated not being refreshed and diluted with the usual and necessary nourishment, the milk of course must be less abundant, and less agreeable.

Well, but it is added, let any person, although in perfect health, be deprived of aliment, and his blood will become more and more acrimonious, and putrefaction and death will ensue.

Let the word putrefaction be omitted, and this may be granted also ; for as the excretions and secretions are all going on, and no fresh supplies thrown

thrown in, except what is absorbed from the atmosphere, the blood of course will be greatly changed ; and if the person continue to be deprived of food, death will undoubtedly ensue ; but whether the putrefaction takes place before he dies, or not till afterwards, is the question.

Those who assert that a diet of flesh, fish, and water, will throw animal fluids into putridity, have forgot that some animals live entirely upon that food.

It is not to be inferred, however, that every author who applies the epithet of putrid to a fever, actually believes that the fluids are then in a state of real putrescence—that term has been long used to distinguish a particular fever. There is the highest authority for the use of expressions adapted to the understandings and received opinions of those to whom they are addressed, although the idea they convey is known to be, in a literal sense, erroneous. Even at present, when it is pretty generally believed that the sun remains always in the same place, yet it is as common to talk of his rising in the east, and setting in the west, as it was in the days of Joshua.

With those who think that the blood of living animals is subject to putrescence, it has been much the fashion to make experiments on animal substances with various medicines, with a view to ascertain their powers of preventing those animal substances from corruption.

Whatever was found to have this power, though in ever so small a degree, was adorned with the name of antiseptic ; those which prevented corruption for a longer time, were considered as more powerful antiseptics ; and those which could restore a piece of flesh to freshness, after it was actually tainted, were thought the strongest of all antiseptics ;

tics ; and it was expected they would retain their powers in the same proportions in the living body; when administered in this fever or other diseases called putrid.

In consequence of those experiments, the shops were soon furnished with such a numerous list of antiseptics, that many well-disposed people began to conceive hopes that putrid diseases of every kind, and particularly the fever so named, would be entirely banished from the world:

But it soon appeared, even to those who had the greatest conviction that putrescency existed in the blood of living animals, that the antiseptic feats performed upon the dead fibres that were soured into a bottle full of those drugs, were not so apparent when the drugs were received into the body of the diseased animal.

These last experiments also produced a total confusion of rank in the army of antiseptics ; many that were advanced to high power and pre-eminence, when employed upon the dead fibres, were thrown into a very subaltern situation after they had been tried on the living body.

It was unquestionably not an unnatural idea to imagine, that those medicines which preserved animal fibres from corruption, or recovered them when corrupted, might have an analogous effect upon the living body, if the living body could be in the same state ; and therefore to make the trial was most meritorious.

And it is highly to the honour of Sir John Pringle, that he did not allow his attachment to system to blind him with respect to the result of the experiments he so diligently made ; for although the root of wild valerian, camphire, and other drugs, appeared to have greater antiseptic powers out of the body, than the Peruvian bark itself, yet he

candidly avows, that while the latter has the most salutary efficacy in the cure of putrid diseases, the former have little or none. Yet this of itself is sufficient to shew how erroneous it is to make the operation of any medicine upon the dead fibre, a criterion by which we can judge of its effect on the living animal; it also goes a great way to prove, that the state of the blood and juices in the diseases denominated putrid, is very different from that putrefaction which takes place in the human body after death.

Dr. Millman, in his Enquiry into the Source of the Scurvy and of Putrid Fevers, has argued this point with the acuteness of a philosopher, and the liberality of a gentleman. He seems to doubt, and he assigns good reasons for doubting, whether the miasmata arising from impure sources, or whatever else may be the causes of putrid fevers, are themselves putrid; while he shews that the affirmative of this proposition has been taken for granted without proof, he fairly acknowledges that he is unable to prove the negative: But he clearly proves, that of whatever nature these miasmata may be, the medicines called antiseptics are no antidotes against their noxious effects; and brings strong arguments in support of his own opinion, that a putrid state of the blood is at no time and in no disease one of their effects; which state of the blood, he thinks, is quite incompatible with life. He next proceeds to establish a new explanation of the matter; and although much precision and ingenuity appear throughout this performance, yet here the reasoning seems not so convincing as elsewhere.

In the opinion of this learned and ingenious gentleman, the seat of all putrid diseases is the muscular fibres, and the immediate source from which all their symptoms spring, is a diminution of the vital

vital power by which they contract; and which he also thinks they possess independent of the nervous system. And to elude the objection that might be made to the supposition, that the same cause which diminishes the force of the voluntary muscles increases that of the heart, he admits that the force of the heart is also impaired; but he imagines that although it is thus rendered less *irritable*, yet it is more *irritated* by an unusual quantity of blood being repelled to the heart by the spasm on the surface.

But even if this were considered as sufficient to remove the objection to the frequent contractions of the heart, the spasm itself remains unaccounted for; and it seems extraordinary, that in a disease depending, as Dr. Milkman supposes, on a diminution of the power of the muscular fibres, there should exist an obstinate *contraction* of the vessels on the surface of the body; for there is no increased irritation of these vessels, as he imagines there is in the heart.

Upon the whole, therefore, the excessive debility observable in the nervous fever, seems to be as naturally accounted for by supposing that the human effluvia, or whatever is its cause, acts upon the brain, by impairing its energy and that of the nerves, and so diminishing the contractile force of the muscular fibres, as by supposing that it acts directly upon the fibres themselves, diminishing their vital power.

As fevers of every kind begin by occasioning a sense of cold or a shivering, and have some other symptoms in common; and as all fevers, when continued a certain time without any favourable change, assume nearly the same appearance, some people have been tempted to think that they all proceed from the same cause; and that the only difference among them depends upon the smaller or greater degree

of force in that cause, and upon the difference of constitution of the persons seized.

But their displaying different symptoms at the beginning, and requiring a very different treatment in their progress, seems to announce that their causes must be different: And he who believes it to be the same, because when the perseverance of the distemper has consumed every source of distinction in the nerves, in the fibres, and in the vessels, all fevers terminate in the same deplorable state of comatose insensibility, may with equal reason believe that all the vast variety of plants, however different in appearance and virtue, spring from the same seed; and that their only difference depends on the quality of the seed and soil, because by calcination they may all be reduced to a fixed salt of the same nature.

But here is another fever, different in its symptoms from the inflammatory or even the mixed, and in which we evidently and speedily do harm, if we observe the same practice which does good in the former; we therefore cannot help thinking it proceeds from a different cause. Cold, marsh miasma-ta, and the other causes assigned as the sources of the other fevers, do not account to us for the greater malignity of this.

In endeavouring to trace this new disease to its source, we consider attentively what particular situations people generally are in, or what peculiar circumstances usually attend them when they are seized with this fever; and, as in other diseases, we call these its causes, although we can perceive no other relation between them and it.

We find that those who have been long subjected to scanty diet, those who are naturally of a weakly constitution, or who, having been originally of a vigorous habit, are weakened by excesses, by disease,

case, by long courses of medicine, particularly of mercury, by profuse hemorrhages, are then most liable to this fever ; we find this is also the case with those who are under the impressions of fear, sorrow, and remorse ; of course we consider fear, sorrow, and remorse, and all the sources of weakness above enumerated, with whatever else impairs the appetite and perverts digestion, or in any way debilitates and exhausts the constitution, as predisposing causes of this disease.

And as the depressing passions are found liable to promote this disease, so whatever rouses and exhilarates the mind, has a tendency to render the constitution less susceptible of this damping contagion, and assists the recovery of convalescents.

The salutary effects of victory on the constitutions of British seamen, are well described by Dr. Blane, late physician to the fleet under the command of Lord Rodney, who furnished that gentleman with more frequent opportunities of making such comfortable observations, than the medical practitioners in any other fleet enjoyed during the last war *.

One of the most distinguishing symptoms of this fever being great dibility, a natural connection is observable between these causes and the fever ; it may therefore be thought, that even *& priori* we could have predicted the effect from considering the causes.

But when we attempt this, for one instance in which we predict right, in ninety-nine we shall pro-

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phesy

* It is hoped that none of the surgeons of the navy will imagine, that any reflection is here intended against them ; there can be no doubt that they would have been equally ready to have made similar observations, had similar occasions occurred : It is only meant here to do justice to Dr. Blane, who having had the good fortune to meet with such opportunities, did not allow them to pass unimproved.

phecy wrong ; and even here the sole connection that we can perceive, lies in the debility ;—those imputed causes seem to have no relation to the other symptoms of the disease.

But observation has acquainted us with a different source of this fever, which acts with more force and more certainty than all the others, and is produced by the crowding and confining too great a number of people within any place where there is not a free ventilation, and which we therefore conclude to be the effluvia flowing from the human body *.

Here our reasoning *à priori* would probably have been at fault, for it would not naturally occur to the imagination of any man, that the effluvia of his own body is more noxious to his health than cold, than the effluvia of putrifying vegetables, insects, corrupted water, and all the other causes of fevers.

Experience alone could have instructed us in this ; and the same experience has taught us, that when the fever is once generated, by people in health being thus crowded, it is rendered still more malignant, by the contagion of those who are seized

* Dr. John Hunter, in a very sensible paper in the Medical Transactions, has proved, contrary to the common opinion, that this source of the disease is more apt to be generated in cold weather than hot. This gentleman having observed, in various instances, the disease with all its distinguishing symptoms in the coldest weather of winter, and always in poor families, where a number being confined to one small chamber, and unable to purchase fuel, assiduously shut out the external air to keep themselves warm ; by which means the effluvia of the wretched inmates was gradually collected, and the stagnating atmosphere of the apartment vitiated, so as to involve, one after another, the whole of them in the same calamity.

In this manner Dr. Hunter observes, cold, instead of preventing this fever, becomes indirectly a means of producing it ; as heat in the warm countries, by inducing the inhabitants to use every means of procuring a free ventilation, tends to prevent it.

ed with the disease, and even by the effluvia flowing from those who are ill of any other disease, particularly the small-pox ; and also by the effluvia of wounds or ulcers, when people so affected are, unfortunately for themselves and for their neighbours, crowded into the same place.

We are therefore not surprized to find it often in barracks, transport-ships, and hospitals, where there is a necessity of crowding too great numbers together, and where it is not always possible to have a sufficient ventilation.

Still less need we be surprized to find it arise in prisons, where nastiness, fear and remorse, may be supposed to concur with the other causes in giving a peculiar degree of malignity to the disease.

In some cases of great malignity, as has been mentioned, this fever becomes so highly contagious, that every thing which comes in contact with the patient's body becomes a source of the fever.

There are some constitutions so very susceptible of this kind of infection, that they cannot remain an hour within the walls of an hospital, even when there is no malignant fever, without perceiving some degree of head-ach and debility for several hours after.

It has not only been observed that people of a weakly constitution are most liable to this disease, but also that people of every constitution are most liable when in a relaxed state ; thus a person will be more apt to catch this disease by *sleeping* a few hours in a place where it prevails, than by remaining the same time in the same place *awake* ; and those who are apt to have head-achs, and feel debility after visiting hospitals, are more apt, when they pay those visits fasting, than if they take a glass

of wine, and eat a piece of bread, previous to their entering them.

For as people of a vigorous constitution are less predisposed to this contagion than the weakly, so whatever rouses the powers of the constitution, and creates a temporary vigour, seems to enable it, for the time at least, to resist a certain degree of contagion.

The human constitution however, as in many other instances, by degrees habituates itself to this kind of atmosphere, so as at length to become little susceptible of infection, even where very infectious diseases prevail. Physicians and surgeons who are much accustomed to attend the sick, and nurses who live almost constantly in hospitals, are not near so apt to be affected by impure air, or by contagion, as others*.—Nothing is a stronger indication of the violent nature of the fever, which at any time prevails in an hospital, than the nurses, and those accustomed to live there, being infected; because it proves that the virulence of the contagion is stronger than common.

That confined human effluvia is infinitely the strongest and most active source of this fever, appears from innumerable observations, and is confirmed by this, that it is one of the few diseases to which the rich, and those who live in affluence and luxury, are less liable than the poor, who, although screened from the enervating effects of luxury and other of the predisposing causes, are much more exposed to the contagion generated in crowded, confined, and ill-ventilated chambers. The middle ranks of mankind, who are accustomed

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* Experiments have been made of gradually accustoming mice and other animals to foul air, from which it appears that they come at length to live without inconveniency in air which proves almost immediately fatal to animals of the same species, taken directly from the common atmosphere, and who have never been so habituated.

ed to active exertions of the mind and body, and such of the inferior class as can by moderate labour procure all the necessaries, and some of the conveniences of life, and who are naturally cleanly, would be still less liable to this fever than the luxurious, were it not for the single circumstance of their having more frequent and immediate communication with the indigent, who are so much exposed to its most powerful source.

Upon the whole, we know that people of delicate, exhausted and sickly constitutions, and those whose minds are saddened by depressing passions, are greatly predisposed to this disease, the immediate seeds of which, we also know, may be generated in places where the human effluvia is collected and confined. And this is the most essential part of our knowledge respecting the cause of this disease ; and even this little is disturbed with uncertainty, for we sometimes meet with instances of people of *robust constitutions*, who are seized with the disease in all its malignity, when they are under *no depressing passion*, when the disease is *not epidemic*, to whom we cannot trace it from any place where the human effluvia could be supposed to be confined in an uncommon degree, or from any person in the disease, of which perhaps there is no other person ill in the neighbourhood for several miles around ; and in short, when we cannot connect it with any of the causes supposed to be the sources of the distemper.

On extraordinary occasions of this kind, we have nothing for it but to suppose, that notwithstanding the apparent vigour of the patient, his body has been peculiarly predisposed to catch the infection, and that some contagion, not forcible enough to infect any other person, has by some unobserved means been conveyed to him ; or if so many suppositions displease, we may suppose at once that there is in some cases a source of this fever which has not yet been suspected.

For

For although the numerous observations that have been made, give us the strongest reason to think, that human effluvia produces this disease, we have no right to infer that it cannot arise also from some other source*.

There is good reason to believe, from history and authentic records, that malignant fevers were formerly more frequent, more universal, and raged with greater violence in Europe in general, and in this island particularly, than they have done of late.

This is generally imputed to the streets and houses of most of the cities, and of London in particular, being more spacious, dry and airy.

From

* The difficulty of discovering the real sources of diseases, and all their sources, appears greater in proportion to the pains which have been bestowed in investigating the subject: If there is a disease in the world, a certain knowledge of the origin of which is interesting to one part of mankind more than all the rest, it is the plague in those countries where it is so extremely apt to break out; yet it appears from the following extract, that the most enlightened even there are still in doubt on that subject.

" M. Michel, physician of the hospital at Smyrna, appears, according to a memoir of which he is the author, sent by M. le Baron de Tott to the Medical Society, to believe in the spontaneity of the plague; for proof of which he cites the following circumstance: A solitary shepherd, having no communication with any body, fell sick while he was tending his flocks; he went into an inhabited part, where he communicated the plague, with which he found that he was attacked. This circumstance would prove much, if it were certain that this shepherd had no communication with others; if it were known how long, and with what precaution he had been secluded from company; but the proofs of these are too difficult to be established, to allow of any conclusion to be drawn from the fact. We are therefore obliged to acknowledge, that we are equally ignorant whether it is in fact a country which is the cradle of the plague; what country this is, supposing that such an one exists; or, finally, whether it sometimes appears spontaneously, and whether the first who is attacked with it becomes the focus from whence it emanates."

See History of the Royal Medical Society for the Years 1777 and 1778, p. 305.

From their being infinitely more cleanly, in consequence of the new method of paving.

From the inhabitants not being so much crowded together.

From their being more cleanly in their houses and persons.

From the poorer in particular being more commodiously lodged, more salubriously nourished, and better taken care of in all respects.

From the disease being more judiciously treated by medical practitioners in general. And, above all,

From our knowledge of the virtues of the Peruvian bark.

During the civil wars in Charles the First's time, this fever raged with destructive violence in the camps, and degenerated into an absolute plague in the capital and in other parts of England.

Some of the circumstances which have a tendency to spread this disease, and render it more malignant and pestilential, prevail, it will be said, in a greater degree in Scotland than in England ; yet the latter has been more frequently subject to pestilential and malignant fevers than the former ; and when this calamity last raged with so much violence in the southern parts of the island, it was little felt in the northern, which naturally may be imputed to the mountainous nature and northerly situation of Scotland ; the one exposing the atmosphere to a brisker ventilation, and the other bracing the fibres of the inhabitants by frosts of longer duration*.

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* To prevent the Scots from being too much elated with this or any other advantage, they have never wanted good-natured friends, who without grudging them either their storms or their frosts, are fond of reminding them of every circumstance that may tend to moderate their pride, and who fail not to remark, that if

This fever sometimes creeps on in such a slow and insidious manner as scarcely to be observed, or wearing such a mild and innocent aspect as to give no alarm for perhaps two or three days.

The patient perceives, indeed, alternate sensations of heat and cold, but so gentle, that he thinks them of little importance.

They are followed by some degree of uneasiness in his head, by want of appetite, listlessness, and dejection of spirits, to remove which his friends endeavour to drag him into company, or advise him to try to shake off his listlessness by exercise, to which he generally is extremely averse. In this condition his pulse is sometimes a little quicker, at other times about the natural standard ; and he himself, never quite well, nor apparently very ill, remains several days brooding over uncomfortable ideas, and either does not sleep, or feels little or no refreshment from his short and disturbed slumbers, starting at the smallest noise, and sometimes when there is none, gradually losing strength, the uneasiness in his head augmenting to a kind of giddiness, his limbs and joints, particularly his knees, feeling weak, and yielding to the weight of his body ; but a kind of tremor of his hands beginning to be perceived, and also in his tongue, when he is desired to put it out, it is at last discovered that the patient, instead of being disturbed with vapours, is under the influence of a dangerous fever.

This fever on other occasions attacks in a more open and avowed manner. The rigour at the beginning being stronger, the succeeding heat greater, and the pulse quicker, but varying in this circumstance every two or three hours, the uneasiness or confusion of the head

their country is less subject to pestilence, it is more exposed to famine than England. This circumstance affords those of their neighbours, who are not less fond of a joke upon account of its age, a great advantage over the Scots in repartee.

head being strongly marked from the first, and is sometimes accompanied with a pain at the bottom of the orbit of one eye, sometimes with a teasing and constant sense of throbbing in the head, which prevents sleep, and hastens delirium.

Without either the pain at the bottom of the orbit, or this throbbing in the arteries, many have from the beginning an increasing confusion in the head, which with a slower pace conducts to stupor and insensibility, very few retaining their senses till death.

Exacerbations are observable towards night, during which the delirium seems a little higher, and the patient more restless. His eyes, which generally are from the beginning heavy, and a little inflamed, become now more lively, he is apt then to speak quicker than usual, and shews an uncommon rapidity in all his motions; a fierce answer from a patient of a mild character is a bad symptom.

Some nice observers think they can, in particular situations of this fever, discover the state of the brain from the eyes alone.

When these appear unusually quick and piercing, they imagine delirium is threatened.

When fixed and fierce, they indicate startings, sub-sultus and great struggling.

When half shut, heavy and bleared with tears, they import the greatest degree of stupor.

When blood seems extravasated in the eyes, the case is almost hopeless.

But in general when the patient does not get any sleep at the beginning of this fever, his eyes are only half shut; and when he awakes, he feels not refreshed, and often denies that he has been asleep at all.

Sickness, and even vomiting at the beginning, are not unfrequent symptoms, though not essential to this fever.

Also pains in the loins, and that sense of weariness in the limbs, usual in all fevers.

The tongue is at first whitish, and generally moist, as if covered with a thin moist white fur, and sometimes it is of a dry, smooth, glossy, red, or crimson appearance, which at last attains a dark-brown colour and horny consistence.

A sudden prostration of strength sometimes happens, so that the patient is in danger of fainting when he is raised from an horizontal posture. When this prostration happens early, it may be reckoned the most distinguishing or the pathognomonic sign of this fever.

There is sometimes very little thirst through the whole course of this disease, at other times the thirst is incessant; from about the third day there is a deficiency of the secretion of saliva, with a dryness and bitter taste in the mouth.

The symptoms are commonly more various in this than in any other fever; the urine, though in general varying less than in other fevers, yet sometimes is remarkably pale, and sometimes of a dark-red colour. When the urine from being thick and high-coloured, becomes thinner and paler, without any great quantity of liquor having been drank to occasion such an alteration, it is an indication of impending or increasing delirium.

A particular eruption of little spots, like flea-bites, is the frequent, but not the constant attendant of this disease. These spots appear generally on the neck, breast and back, seldom on the face and limbs; they are to be seen, but not felt, having no elevation above the surface of the skin; they are seen sometimes as early as the fifth or sixth day, at other times not till the end of the second week; they seldom appear after that period, and are never critical; they are rather a bad symptom, though many recover upon whom they appear: The spots are generally of a crimson complexion, and

the

the darker the more dangerous. When these petechiae are quite black, or when purple vibices, like the wales of a stripe, appear at the same time, the danger is very great.

Bleedings at the nose sometimes occur at the same time, which are very seldom useful, but rather prognosticate ill.

It sometimes happens that in the first two days the patient loses strength to a degree that does not usually occur till the eighth or ninth day ; in such cases the patient is in the utmost danger, in far more than if the same degree of weakness had come on gradually. Sometimes, though rarely, the delirium is of the high kind, with a wild frantic look, with unusual quickness in the voice and motions, although all the while the pulse is low ; and instead of a tremor of the hands, there is a strong subsultus tendinum. Such cases are generally accompanied with wakefulness, and often terminate fatally on or before the seventh day.

But the delirium of this fever much oftener consists of a low state of stupidity, attended with frequent muttering ; in which the patient, from having been too acute of hearing, becomes almost perfectly deaf.—This is generally accounted a favourable symptom, and certainly has a good effect, hindering the patient from being disturbed by any accidental noise, or by the whispers which are apt to go on too constantly in his bed-chamber.

When this disease lingers, that is, when it passes the second week, the patient is apt to continue for several days, with little alteration, in a state where the insensibility is greater in appearance than in reality, and seems in a considerable measure to be owing to deafness ; for although he is not able to combine a number of ideas, yet when a simple proposition is hallooed into his ear, desiring him to put out his tongue, or asking if he chooses to drink, he directly shews that he understands

understands what is desired. And he shews the same degree of intelligence when certain signs are made to him, by accommodating himself as much as is in his power to what is proposed. When a vessel containing a liquor he relishes is presented to his sight, he immediately prepares his lips for sucking it in. When he knows that the vessel contains a liquor he dislikes, he shakes his head or shuts his mouth and eyes as often as it is offered.—From this state, after lingering for many days with little variation, the patient not unfrequently recovers.

But there is a greater and more dangerous degree of insensibility, which occurs when the patient lies in this dozing state, where he shews that kind of confusion and want of accuracy of idea, which people have in some oppressive dreams. In this state the patient evinces a sense of bodily uneasiness, without being sufficiently distinct to refer to the part of his body where the impression is made.

Thus patients who are not very attentively looked after, are apt to have painful excoriations, or particular parts greatly inflamed, and even threatening mortification, from the mere pressure of their bodies, by being allowed to lie too constantly on the same parts. They display a general sense of pain, by a frequent moaning, but have not sufficient accuracy to point to the part affected.

The irritation of fæces in the rectum, or of urine in the bladder, sometimes occasions much distress to the wretched patient, whose oppressed and bewildered senses cannot distinguish the cause of his sufferings, and which nature in particular cases is tedious in relieving. But that this retention is the cause of his distress, is sufficiently evident from his giving over moaning, and acquiring a state of comparative ease and calmness, immediately after evacuation.

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This circumstance should prompt those whose duty it is to watch over the patient, to redouble their attention, in endeavouring to discover the source of his sufferings when he shews symptoms of uneasiness, and to make up for the confusion of his senses by the distinctness of theirs. The acuteness even of a nurse on such occasions may save a patient whole hours of distress, and possibly may save his life.

There is a particular symptom, which if I am to judge from the cases that have come under my own observation, I should think fully as dangerous, if not more so, than the last mentioned. When the patient lying on his back (for that is his constant posture when this symptom occurs) with his eyes open, receives with marks of eagerness the drink that is presented to him, and having taken a mouthful, keeps it in his mouth without attempting to swallow it, not because he cannot swallow it; for after he has kept it in his mouth a considerable time, if the cup is presented to his lips again with more drink, he immediately swallows the first mouthful, and takes a second, which he retains in his mouth in the same manner as he did the first.

It seems as if the patient, upon seeing the liquor, has the idea of taking it into his mouth, and immediately forgets that he is to swallow it, which marks a very great degree of absence or confusion of mind; he will on these occasions retain it a very long time in his mouth, and perhaps spit it out at last, or allow it to glide out imperceptibly, if no means are used to make him swallow it.—The means are, simply to shew him the liquor, and present the cup or spoon to his lips again while he has the former spoonful in his mouth; at sight of a second spoonful he swallows the first; on seeing a third approach, he swallows the second; and so on, till he has taken the full quantity intended, or till he shews aversion to the taking any more. The only precaution necessary is, to give the different spoonfuls

fuls at short intervals, and not too rapidly, lest a fit of coughing be raised, and the liquor rejected.

It may seem strange that the same degree of recollection that prompts the patient to suck in the liquor, does not also prompt him to swallow it. Whoever thinks so, may account for it in any other manner he thinks more satisfactory ; but those who will attentively observe all the various symptoms of this fever, will find, that in certain cases this happens exactly as above represented.

I myself have been assured, on entering the patient's bed-chamber, "that he could no longer swallow ;" "that he could take indeed a little into his mouth ; but "there he would keep it for a quarter of an hour per- "haps, and then would allow it to escape out of his "mouth again, without swallowing a drop." On which I have called for some wine, the same liquor which I had been told the patient could not swallow, and have given him one spoonful after another, in the manner above mentioned, till he had taken the quantity I judged proper.

A difficulty of swallowing, however, is also a symptom of the disease, which sometimes proceeds from the dryness of the throat, and sometimes from aphthæ on the tongue and throat ; but the case above mentioned is an essentially different symptom.

It is also a very bad symptom, and proceeds from the same cause, when the patient, after putting out his tongue, forgets for a considerable time to draw it in again, or shews a continual uneasiness, by frequently throwing the bed-clothes from his body, and endeavouring to get out of bed, without giving any reason, when asked, for so doing.

The patient is frequently observed to draw his breath in a laborious or convulsive manner, fetching deep sighs, or rather sobs, as if he were under severe affliction, or felt much oppression about the precordia.

precordia *. The breath and perspiration also, in particular cases, have been found stronger and more offensive ; and, upon pressing the skin of the patient, a sensation of a peculiar penetrating heat remains on the hand for some minutes after ; whereas the heat communicated by the skin of a patient in the inflammatory fever is more transient.

The heat of the skin is more moderate at the beginning, in this than in other fevers ; and unfortunately, this peculiar and permanent heat is not perceptible till the disease is far advanced.

The languor and despondency of the patient's mind is strongly marked from the beginning in the dulness and heaviness of his eyes ; but it is a fatal symptom when the eyes become blood-shot and glassy, which often happens before the termination of this fever.

Towards the close, when Nature and the efforts of the physician prove unable to resist the malignity of the disease, all the distinguishing marks of fevers are obliterated ; and the concluding scene is common to all.

The strength being almost entirely exhausted, the patient lies constantly on his back, with a perpetual propensity to slide to the bottom of the bed ; the hands shake when they attempt to lay hold of any thing, : and a continual twitching is observed in the tendons of his wrist ; the tongue trembles when it is pushed forth for the inspection of the physician, or all attempts to push it forth are unsuccessful ; a black and glutinous crust gathers on the lips and teeth, to the increase and inconvenience of which the patient seems now insensible. He seems equally insensible to the ardour of thirst ; he mutters to himself ; he dozes with his mouth half open, the lower jaw falling down as if the muscles

were too much relaxed to resist its own gravity ; he sees objects indistinctly, as if a dark cloud hung before his eyes ; small black particles, called by physicians *muschæ volitantes*, play, as is believed, before his eyes ; for he often catches with his hands at those or some such objects of his disordered brain ; he frequently extends his arms before and above his face, seeming to contemplate his nails and fingers ; at other times he fumbles with his fingers, and picks the wool from off the bed-clothes ; he loses the power of retention ; the evacuations pass involuntarily ; and, as if lamenting his own deplorable condition, tears flow down his ghastly countenance ; the pulse flutters small as a thread, and on a pressure very little stronger than common, is not felt at all ; his legs and arms become cold ; his nails and fingers blackish ; his respiration is interrupted by hiccup, and finally by death.

It may seem superfluous to add, that a general description is different from a particular case ; in the one all the symptoms are enumerated, though they cannot be supposed to be united in every individual.

In this fever it frequently happens that many of the symptoms now mentioned are prevented, and the duration of the disease shortened, by a fatal diarrhoea or dysentery.

Some physicians have, by splitting this disease, made two distinct fevers, describing the one under the name of the slow nervous, and the other under that of the putrid malignant fever.

On comparing the descriptions, however, or, what is of more importance, on studying the symptoms from Nature, it will appear, at least so it seems to me, that the two are essentially the same, and that the apparent difference depends upon the degree or upon the different constitutions of the patients.

We are told, " that the nervous fever attacks persons of weak nerves, thin poor blood, dejected spirits, and exhausted habits ; whereas the putrid fever is more likely to appear among those of a fuller habit of body, stronger constitution, and who are accustomed to richer and hotter diet."

The disease, I imagine, attacks persons of all constitutions ; but those of the first description are most susceptible of it, and the symptoms are in some particulars different when it is ingrafted on the one, from what they are on the other. The essential symptom of great debility and nervous affection are common to both.

With regard to the opinion that one has its seat in the lymphatic and nervous juice, and the other in the blood itself, I have nothing to say farther, than that before a great deal of trouble is taken to find out what is seated in the nervous juice, it will not be amiss to ascertain that there is such a juice ; and even then the rest of the opinion is hypothetical, will be difficult to prove, and when proved, will leave the method of cure where it is at present.

Many of the symptoms of this nervous fever are unquestionably common to all fevers, and some of the most distinguishing marks of this do not appear at the beginning, or, perhaps, in many instances, not till a method of cure has been adopted that would not have been used if the nature of the disease had been known. It is of great importance therefore to detect this as soon as possible ; which consideration may form an apology for recapitulating such circumstances and symptoms as peculiarly distinguish this fever ; and although none of them, taken singly, can mark with certainty its existence,

yet the combination of a few will form that degree of probability which justifies a decisive practice.

1. Instead of the strong hard pulse which attends the outset of other fevers, in this it is sometimes so little altered, that we are apt to suspect the patient exaggerates in the account of his complaints ; it varies more than other fevers both in quickness and slowness, and also in strength and weakness ; and sometimes there are considerable variations even in the course of one day.
2. The heat of the skin is more moderate at the beginning of this than of other fevers ; for that penetrating heat of the skin, which is peculiar to this fever, is not perceptible at the beginning.
3. The skin, instead of appearing reddish, is generally pale.
4. The pain, or rather heaviness of the head, is not so acute as in other fevers, but is attended with more dejection of spirits, and augments with a slow but steady pace, seldom remitting after it commences, unless it is checked by the bark.
5. When this heaviness in the head is attended with tremor in the hands, there is little doubt of the fever being of the malignant kind.
6. There is a greater degree of languor and despondency in this than in other fevers.
7. Greater muscular debility.

If a sudden and unexpected debility take place, there can be no doubt with regard to the nature of the disease *.

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* Mons. Tissot, when treating of malignant fevers, observes, that they are more dangerous than they seem, like a dog who bites without barking ; and then proceeds to inform us, that " The characteristic of malignant fevers is, the total loss of strength from the beginning."

This however I should consider as barking very loud ; but this decisive symptom does not always appear till the fever has existed some days,

The malignity of this fever is generally in proportion to the debility at the beginning.

To investigate the nature of the fever from the appearance of the blood, is equally uncertain and inexpedient, both because at the beginning even of this fever it shews some share of inflammatory buff, and because to determine whether we ought to bleed or no, is one chief reason of our wishing in the first place to be certain of the nature of the fever.

The weakness that immediately follows bleeding, shews at once the nature of the fever and the impropriety of the evacuation.

When the symptoms are so obscure or ambiguous that we cannot form a decided opinion respecting the nature of the fever, the obscurity may be dispelled, or at least some light may be derived from the following circumstances :

Whether putrid fevers prevail.

Although no such epidemic does prevail, whether any connection or communication can be traced between a single person in this kind of fever, and the patient.

Whether the patient has lately been weakened by excesses, by disease, by hemorrhage from wounds or otherwise.

Whether he has been long under the influence of the depressing passions, or of dejection of spirit, independent of a known cause.

Having paid due attention to every source of information, and after weighing every circumstance, being at length satisfied that the fever is of the malignant kind, we proceed to the cure.

As confined air, particularly that which is loaded with human effluvia, seems so intimately connected with the peculiar malignity of this fever, the expediency of a free ventilation through the patient's chamber is obvious, and perhaps, if not of

itself the most effectual curative measure that can be taken, is at least that upon which the success of all the others seems most to depend.

To those whose circumstances afford the comfort of a spacious well-aired bed-chamber, all the benefit that can flow from this measure, will be obtained by occasionally throwing open the doors and windows, and allowing the room to be refreshed by a current of fresh air.

When the chamber is small, if the weather is mild, and the patient can with tolerable convenience be carried into the open fields or into a garden, and allowed to sit there a few hours, it ought to be done; for this practice has been found highly refreshing and cordial.

When from various circumstances this cannot be done, every means in our power to procure a free ventilation must be used, and the chamber should be frequently refreshed by sprinkling it with vinegar.

Confining the patient constantly to his bed, under a load of bed-clothes, by which means his body is always surrounded by a kind of vapour-bath of his own effluvia, is exhausting and pernicious.

The bed-clothes ought to be in no greater quantity than is agreeable to his own sensation; and when he can sit up in an elbow-chair with his clothes loosely put on, it is often a refreshing change of posture and situation.

There are instances of patients in this fever, who while lying in bed thought their strength so much exhausted, that they could not possibly sit in an erect posture even for a few minutes; yet upon being carried on a couch into the open air, and remaining there for two or three hours, have been so much refreshed, and have acquired such an accession of

of strength or spirits as not only to sit up, but even to stand and walk a little.

In cases where the patient can easily be moved into the open air, it is not impossible that the cheering verdure of the fields and rural objects, with the refreshing smell of plants, at particular seasons of the year, may contribute to the cordial effect which a free cool atmosphere is found to produce.

Those who have been long teased and harrassed for want of rest, while confined under a load of bed-clothes, have obtained refreshing slumbers after their bodies have been cooled by the restorative influence of the open air ; and afterwards find their beds more comfortable, particularly when furnished with clean sheets and cool fresh covers. With changes in this last article, those who can afford it should frequently be furnished.

Whatever benefit is derived from the use of a stronger and more effectual ventilation in this fever than was formerly allowed, or from the open atmosphere, when the patient can with safety and convenience be carried into it, the honour is due to those who first advised and introduced this judicious and successful practice in the inoculation of the small-pox. After its salutary effects were manifest in the one disease, its application to the other was obvious ; and indeed when we recollect that putrid fevers often originate in places where a perfectly free ventilation cannot be obtained, its application to this disease seems more natural than to the other.

As in the high inflammatory fever the symptoms seem to arise from the heart being stimulated to stronger exertions than are consistent with health, and therefore we look for the cure in such means as we know have a tendency to abate these violent exertions ; so in this fever, whose striking feature

ture is debility, in which the nervous energy seems impaired, and the action of the heart is weaker than is consistent with health, we look for the cure in such means as give vigour to the vital powers.

Evacuants which diminish the quantity of the blood and humours, and refrigerants which are thought to abate their heat, are therefore thought proper in the first case; cordials and strengtheners in the second.

It has been thought that bleeding may be necessary at the beginning of this disease, to prevent the fever from running too high, and producing inflammations of the brain, lungs, or other vital parts.

But all the observations I have been able to make, and the knowledge I have otherwise been able to acquire, convince me that we have much more certainty of the bad effects of blood-letting in this fever, than we have of the evils it prevents; part of this conviction I have received from the writings of two very eminent and very learned physicians, neither of whom seem themselves however to have been so fully convinced of the bad effects of this evacuation.

Dr. Huxham, after describing the case of a patient, with the strongest symptoms of a putrid fever, adds, "He was bled to about $\frac{3}{4}$ xii. from his arm, but this gave him no manner of relief; the oppression, sighing, fainting and anxiety, continuing as bad as ever, nay rather increasing; a violent hemorrhage also broke forth from his nose; which continuing from both nostrils, he was bled again to $\frac{3}{4}$ x. about twelve hours after the former bleeding: Neither did this give him any relief, but increased his weakness considerably, and he continued as anxious, restless and oppressed, as ever, without even the least sleep*."

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* Vide Huxham's Essay on Fevers, pages 63 and 64.

The Doctor continues to relate the low state to which his patient was reduced, and the dreadful symptoms which accompanied it ; that he avoided giving him the hot, alexipharmac and volatile cordial medicines, which it was too much the practice of that time to administer in such cases ; that he also declined the application of blisters, but that having experimentally and repeatedly known the great use of the bark, in preventing and stopping the advance of gangrenes, he ordered that medicine with elixir vitrioli ; and by the continued use of these and some other restoratives the patient recovered.

This ingenuousness displayed in the recital of this case, must strike every body ; few will be surprised that the two bleedings afforded so little relief, and many will be of opinion, that if the learned physician had treated his patient from the beginning as he did at the end, the disease would sooner have come to a happy termination.

Indeed he seems afterwards to lean to this opinion himself ; for in a subsequent part of his book he expresses himself in these words : " In truth, bleeding in a contagious disease, as arising merely from contagion, seems not indicated, because the contagion is intimately mixed with the humours, and by drawing off a small part of the blood, you very little lessen the whole contagion, which will have its effect whether you bleed or bleed not*."

The reason assigned for bleeding not being indicated, is unquestionably very ingenious ; but the reason which makes the greatest impression upon my mind for not bleeding in this fever, is simply because it seems generally to do harm.

Those who still are of opinion that bleeding is necessary in this fever, confine it to those cases in which the pulse is strong and full. It has been already

* Vide Huxham's Essay on Fevers, page 102.

ready observed, that the pulse is generally not strong and full in this disease ; and when the pulse is in this state, we are apt to imagine that a disease of a different nature is impending ; this, to be sure, may serve as an apology for the evacuation, which, if we had been certain of the nature of the fever, the fulness of the pulse, in my opinion, would not have done.

The other work above alluded to, which helped to give me an early impression of the inexpediency of bleeding in this fever, is the Observations on the Gaol or Hospital Fever, by the late Sir John Pringle :—This learned gentleman's words are, “ But in the second state, when the fever was manifest, if the pulse was full, I generally took away some blood, if that had not been done before. When the symptoms run high, a plentiful evacuation of that kind seemed indicated ; yet *I observed that large bleedings generally did harm, by sinking the pulse and affecting the head.* Nor was a moderate bleeding to be repeated without caution ; for as several circumstances here were different from those of common fevers, so experience shewed, that even those whose blood was sify, unless their lungs were inflamed, were the worse for a second bleeding *.”

Certainly there can be few stronger reasons for bleeding than an inflammation in the lungs ; but I imagine this is not a common symptom in the malignant fever.

The same learned gentleman afterwards says, “ But what is *observable*, if the patient had been once or twice largely bled, on the first symptoms, he would sometimes pass over the second stage, and from a condition little removed from health,

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* Vide Sir John Pringle's Observations on the Diseases of the Army, pages 306 and 327.

" his pulse would be apt to sink, and he suddenly become delirious. Now, whether this change was occasioned by misconduct, or came in the course of the disease, I found it necessary to vary my method, and to have for my principal intention the support of the *vis vitæ* §."

I did think the above remark so very *observable*, that I became more and more cautious of bleeding in this fever, being confirmed in a more successful practice by what this diligent and attentive physician continues to relate, concerning the accident by which he was induced to give the bark to a man ill of this fever with petechial spots. The bark, he candidly owns, was not given on account of those or any other symptom of the fever, but because a mortification threatened the patient's back after a blister. The use of this medicine not only stopped the progress of the mortification on the man's back, but gave a favourable turn to the fever ; which happy effect did not escape Sir John Pringle's attention, but led him to give the bark in many other cases, the good effect of which he enumerates.

It has been observed that this fever is most apt to begin with inflammatory symptoms, in such patients as are much exposed to cold and moisture ; and that in camps particularly, symptoms of that complexion are more apt to appear when the disease is epidemic, than in cities, which is imputed to soldiers having fewer conveniences, and being less guarded against the influence of cold, than the lowest class of the inhabitants of towns.

Dr. Donald Monro, in his account of the diseases of the Military Hospitals, observes, " That this malignant fever began variously in different subjects ; " for the most part with cold and shivering, pain in the head, and other symptoms commonly described

" as

§ Vide Sir John Pringle's Observations, &c. page 311.

" as peculiar to this fever: In some it began with a
 " sharp pain of the side, or other parts, attended with
 " acute inflammatory symptoms," &c. A little below
 he makes the following judicious reflection: " The
 " reason of this difference of symptoms in the begin-
 " ning, and of these different appearances of the blood;
 " seemed to be, that such patients as laboured under
 " pleurisies, low or other fevers, being brought into
 " hospitals, where the malignant fever was frequent,
 " had their original disorders changed into this fever
 " by breathing a foul infected air, and by their com-
 " munication with those ill of the fever and of
 " fluxes *."

Upon the whole, I imagine it may be laid down as a rule admitting of very few if any exceptions, that bleeding is highly improper when we are certain that the disease is the true nervous malignant fever; for since we find that this fever can change the nature of highly inflammatory diseases, and convert them into its own, to venture upon this evacuation in cases where no local inflammatory complaint is superadded, must do still more harm by hurrying on the symptoms of debility, by much the most dangerous of the disease.

To free the alimentary canal of all impurities, is equally expedient in this as in other fevers, and the sooner it is done the better; on the very first appearance, therefore, of uneasiness in the head, listlessness, or alternate heats and colds, five or six grains of emetic tartar may be dissolved in a quart of warm water, or of camomile infusion, of which the patient may drink half a pint every quarter of an hour till it excites vomiting, which ought to be assisted as usual by drinking freely of warm water.—The emetic generally relieves that

* Vide Dr. Monro's Account of Diseases in the Military Hospitals, &c. pages 7 and 8.

that oppression about the precordia which so commonly attends this disease.

If this medicine should, some hours after operating as an emetic, also act effectually as a purgative, which is often the case, no other purgative will be necessary.

But if it only proves emetic, the contents of the intestines should be entirely evacuated the following day by a proper cathartic medicine.

The evacuation by a cathartic undoubtedly weakens in some degree, as well as that by venesection; but this is more than compensated by the benefit resulting from cleansing the bowels of their impure contents; whereas venesection, without producing any certain benefit, is apt to occasion greater debility, and of a nature not so easily to be remedied.

Besides, a cathartic exhibited in proper time often prevents the bad effects of too severe purging, by carrying off the source of an impending diarrhoea, which might soon take place in consequence of bilious matter and other impurities being pent up in the bowels.

And in case a diarrhoea has actually come on before we see the patient, the first thing to be done is to give a purgative, whose operation should be assisted by drinking plentifully of imperial, or of water gruel, or barley-water, with some cream of tartar dissolved in them; and if the patient seems much fatigued and exhausted by the preceding looseness and the operation of the purgative, eight or ten drops of Thebaic tincture may be given in a spoonful of simple cinnamon water.

It was observed before, and ought to be kept constantly in remembrance, that the danger of this fever is in proportion to the debility. If it be doubtful whether in the common remitting fever it is always prudent to delay giving the bark, and

to confine our treatment to antimonial alteratives, faine mixtures, and neutral salts, in expectation of a more complete remission ; it may easily be conceived how much more improper it would be to delay that powerful medicine in this insidious temper, where the force of the circulation seems impaired from the beginning, and the most dangerous prostration of strength is apt to come soon after the first perception of any ailment.

When a malignant fever happens to be epidemic, the slightest appearance of complaint should give an alarm, and forms a good reason for ordering an emetic and purgative ; if to the head-ach is joined dejection of spirits, slight chills and heats, and the smallest tendency to tremor in the hands, the alarm should be taken independent of any reigning epidemic, and in both cases the bark should be given immediately after those evacuations.—What, while the skin is dry ? When there is little or no perspiration ? During the spasim ? Yes, during any thing.

Theoretical opinions must in such an emergency have no weight : A dangerous debility, and a train of malignant symptoms, are threatened ; the bark is found the most powerful means of preventing these ; and notwithstanding its astringent quality, frequently promotes a salutary diaphoresis more effectually than any of the medicines which enjoy from prescription the title of diaphoretics. When the patient is out of danger, you may account for this in the best manner you can, and settle the point at leisure, whether in producing these effects it has acted in the character of a tonic, a diaphoretic, or an antiseptic.

In the circumstances that have been described, the nature of the disease being ascertained, and the alimentary canal entirely cleansed, the bark should be given without waiting for very distinct remissions.

sions. To wait for such when the disease appears from the beginning to be the nervous malignant fever, is to wait for what will not happen ; depriving the patient of a probable chance of the fever being carried off at once, and allowing him to incur a risk, which might have been prevented, of sinking suddenly into such a state of weakness and insensibility, as will render the bark and all other medicines of no avail.

Having resolved then on giving the bark, our next care should be to avoid the very common error of underdosing it. One ounce or an ounce and a half of this medicine may be given to an adult in the space of twenty-four hours ; or if it is disagreeable to the patient in substance, what is equivalent to this quantity may be given in decoction ; some patients can take the powder in the decoction as easily as in any other vehicle. A much larger quantity has been recommended by some authors in the same space of time, but there are very few patients whose stomachs can bear a greater quantity, and many who cannot take so much. The expediency of increasing or diminishing the doses must depend upon circumstances. Whether this medicine be given in substance or in decoction, the addition of a few drops of elixir of vitriol is often found to render it lighter and more agreeable, perhaps, in some cases, more effectual.

If the pulse is particularly small, and the patient complains of great weakness, a little wine may be given occasionally even at this period of the fever ; it may be added to panado or water-gruel, if the patient can take any such nourishment ; or a little may be mixed with each dose of bark, which sometimes is found to remain easier on the stomach by this addition. But the propriety of giving or con-

tinuing wine at this period, depends on the strength of the pulse, and the effect of the cordial.

It is not improbable that the bark itself, exhibited in this manner, will prove opening in such a degree as to supersede the use of any other means for that purpose; but if the body continues bound, it will be expedient to procure one motion daily by clysters. If, on the contrary, the bark excites a purging, this effect may be restrained by giving two or three drops of laudanum in each dose, or every second dose of bark.

After the medicine has been continued in this manner for two or three days, we often have the satisfaction to find the fever entirely thrown off, or abated in a considerable degree. In either case it will be proper to continue the use of the bark, but in a much smaller quantity, for two or three days more, at the end of which the fever is generally gone, and the pulse slower than before it began.

It sometimes happens in this fever, that a quick and weak pulse is accompanied with difficult respiration and confusion in the head, and that both symptoms proceed principally from debility; in such cases the bark renders the pulse fuller and stronger, and in proportion as it becomes fuller, it becomes also slower; the oppressive breathing abates, the threatened delirium is removed, the skin, which was before dry, is perceived to be moist, with a warm and gentle perspiration, and a sediment is soon after perceived in the urine.

But if after a fair trial for two or three days, the disease seems to have repelled the powers of the medicine, still there is no harm done, the fever will run its course, but the patient has as good, perhaps a better chance of recovering at last, than if the trial had not been made; for although the bark has not been able to prevent the progress of the fever, it may tend

to obviate or lessen in some degree that excessive prostration of strength which is its most alarming symptom. It is difficult, if not impossible to prove, that what does not happen, or happens only in a certain degree, would have happened in a greater degree, if a different method had been followed. Yet in certain cases where the bark has failed in throwing off the fever, it seemed to me that the medicine had still contributed to support the patient's strength, and to prevent the excessive debility.

When however this powerful febrifuge fails in the principal object of stopping the progress of the fever, and when the patient perhaps nauseates any farther use of the medicine, our next care must be to support his strength by light nourishment and more agreeable cordials, during the continuation of the disease ; taking care at the same time by laxative clysters, seasonably administered, to obviate that tension and swelling of the belly, difficulty of making water, and other inconveniences, which are the consequence of constipation ; and if clysters are not found effectual in preventing or removing these, a gentle dose of rhubarb, or some other mild purgative, must be occasionally given, which in this situation will prove, in effect, a restorative, and not a weakener, by throwing out of the body the source of many teasing and exhausting symptoms : A few grains of James' powder, given twice or thrice in twenty-four hours, often proves the most beneficial laxative that can be given.

Although the fever has eluded the first attempt of removing it by the bark, and although the patient, disgusted with the quantity he has swallowed during the trial, has refused to take any more, yet if afterwards in the course of the disease this disgust wears off, and the patient can be persuaded to take two or three doses in the twenty-four hours ; even this small quantity has often seemed to me to support

port the patient against that dangerous debility, which seems ever impending in this fever.

The reputation of the bark is independent of theoretical opinions. Those who believe in a prutrescence of the blood and humours, give it as an antiseptic; those who believe in no such matter, give it as a tonic: For my own part, I recommend it as a medicine that does good, without pretending to know, and being little solicitous about the particular character in which it acts.

It is not uncommon in the practice of medicine for physicians to follow the same plan on different, or perhaps opposite principles. Thus one may recommend ripe fruit, vegetable juices, and acidulated drinks, in this fever, with a view to correct the putrid tendency of the humours; another who knows it is impossible for these fruits and drinks to correct what he thinks does not exist, may still prescribe them with a view to their deterging the excretory vessels, by their sudorific and diuretic qualities; and each may be confirmed in his supposition by the benefit the patient receives from the prescription. Some people may doubt either supposition, but nobody can doubt the agreeable and refreshing effects of such fruits and juices on the parched, thirsty, and languid patient.

Sometimes ripe fruits, particularly strawberries and wine, are the only nourishment he will take; which circumstance of itself forms a presumption, that they are the propereft for him. At other times, when he refuses panado, sago, rice, when prepared without wine, he will take them in considerable quantity mixed with wine and sugar; and when he takes such nourishment with any degree of relish, they seldom fail of being beneficial. They enable him to bear the open air and a free ventilation for a longer

a longer time, which always tends to hasten his recovery.

When that prostration of strength, so often mentioned, has taken place, and is followed by stupor, low delirium, twitching of the tendons, and other symptoms ; however proper we may think the bark would be, and however eager we are to give it, this is no longer in our power. In this state the patient generally rejects it in all its forms, or will only take it in such small quantity as can be of no service. Yet the case is not entirely hopeless ; for even in this situation, if the lips are moistened with a little warm wine, sweetened with sugar, he will shew a relish for it, and when given in spoonfuls, will suck it into his mouth, with signs of satisfaction, after rejecting every medicine with disgust, and refusing every other kind of nourishment whatever.

In one particular case of this nature, which I well remember, after a certain quantity of wine (perhaps near a pint) had been given in the space of an hour, I perceived the patient's pulse acquire strength, and become flower, while the insensibility seemed to wear gradually away ; but the relations taking an alarm at this quantity of wine, notwithstanding those flattering appearances, withheld it, and offered the patient some other drink, which in their opinion was more suitable to his case. Notwithstanding his again and again rejecting every thing they offered, it was not till after they plainly perceived the pulse begin to sink, and the delirium to return, that they could be prevailed on to give more wine, which, upon my returning to visit the patient, I persuaded them to do, and with the same success as before.

I have known instances also, where the physician not being convinced that the filling of the pulse and

removal of delirium was owing to the wine, has set aside the use of it in the same manner, till the return of the bad symptoms obliged him to resume it, not without remorse for having made an experiment which had like to have proved fatal to the patient.

It is generally necessary, in such cases, to begin by giving the wine warm with sugar, to induce the patient to take three or four spoonfuls; but afterwards he takes it freely cold, and without sugar.

The reader might be astonished were I to mention the quantity of wine I have known some patients take in this fever, and in some cases of the confluent small-pox, where the weakness, insensibility and other symptoms, were the same, and where the recovery of the patient was evidently owing to that cordial alone. The proper rule is to give the wine till the pulse fills, the delirium abates, and a greater degree of warmth returns to the extremities.—Upon the smallest appearance of the stupor coming back, the pulse quickening and sinking, for they all go together, the wine must be resumed.

Attentively observing this rule, I have often known patients, who in health were not fond of wine, and who would have been intoxicated with a single bottle, drink in the space of twenty-four hours two bottles of claret without any other effect but that of strengthening the pulse, abating the delirium, removing the tremor, and creating a moderate warmth on the skin. In others I have known a much greater quantity necessary to produce the same effect; but by giving that greater quantity, the same effect was produced. As I am told that this part of my work (and perhaps many others) will be exposed to censure, I refrain from mentioning the exact quantity of wine which I have known some particular patients take, with the best effects, in this fever—it is sufficient to say, that it ought to be given in such quantity

quantity as the patient will willingly take, till the effects above mentioned are produced, and then stop ; but on the first appearance of the pulse becoming weaker, or any other symptoms returning, more wine must then be given, persevering in that quantity which is found by attentive observation sufficient to keep up the pulse, and ward off the other bad symptoms.

When that quantity has been continued for several days, it may be gradually diminished ; a little bread soaked in the wine, or some other simple nourishment, may be offered. After the patient is able to take panado mixed with wine, or bread soaked in it, with any degree of relish, the appetite sometimes becomes very keen, and he is even willing to take more panado, rice, or sago mixed with wine, than is proper for him.

This return of appetite is undoubtedly one of the strongest indications of returning health ; but it must be indulged with caution ; the patient must be allowed to eat but little at a time, even of this kind of nourishment, and to return very gradually to his usual food.

Soon after the fever is entirely removed, and long before the patient has recovered his strength, he will, by proper management, be entirely weaned from the wine, or his allowance may be reduced to two or three glasses in a day, if the physician should think that quantity more proper than none. Indeed, the third part of what formerly had proved a salutary cordial and a restorative, would, in this state of convalescence, occasion a dangerous intoxication. So great a difference is there in the effect of this cordial upon the constitution, in this state of extreme weakness, when all the natural functions seem loaded and clogged by disease, from what it has in perfect health, or when the fever being

just removed, the animal functions gradually resume their former course.

Claret is the wine I have generally recommended, when the circumstances of the patient could afford it. I have seen the same good effects, however, from the use of Port, Madeira, and other wines ; and when no kind of wine is to be had, brandy or rum diluted with water or milk, and sweetened with sugar, must be substituted in its place. In the state of stupor, debility and low delirium, already described, spirits diluted have nearly the same effect with wine, and are even more relished by a certain class of patients.

In what is called the putrid sore throat, and in cases where the symptoms of weakness, always considerable in that disease, are greater than usual, the bark sometimes will not remain upon the stomach, unless it is given in wine ; and when so given, its beneficial effects seem most apparent ; and in many cases of that disease which I have met with, where this reason for giving wine did not exist, and the bark was taken in very considerable quantity alone, the effect of filling the pulse and removing the alarming debility did not appear to me so evident and certain as when the medicine was given in wine ; even a smaller quantity of bark, with the addition of wine, seemed to have a more immediate and more considerable effect than a much larger quantity without wine.

The cynanche maligna, a disease analogous in some essential circumstances to this fever, was frequently epidemic in that part of the country where I formerly lived. Wherever the symptom of debility was considerable, my constant practice was to give the bark from the beginning in Port wine to adults, and in wine and water to children, and always with good effect ; the whole of the treatment consisted in this

this and the frequent use of gargles. In the villages around, where great numbers were generally ill of the disorder at the same time, and where spirits diluted were preferred to wine, the same good consequences attended their use; very few patients were lost, except in cases where this practice was not observed.

I have seen the weakness so great in this disease that the patient could not sit up in his bed, that his throat might be accurately examined, without danger of fainting; yet after a few doses of bark mixed with Port wine or Madeira, his pulse became stronger and fuller, and he raised himself with little assistance, and sat up firmly; but in other patients, in nearly the same situation, double the quantity of bark taken in any of the simple waters, hardly produced the same effect, and never so soon: And where wine was not to be got, or could not be afforded, rum or brandy diluted seemed in all respects equivalent. However pernicious the habitual and immoderate use of wine or other spirituous liquors may be in perfect health, yet when the energy of the brain and nerves is so much diminished, and the vital powers of the muscles so benumbed by certain diseases that the spark of life seems almost extinguished, those cordials are then absolutely necessary to keep it alive, and give time to the bark or Nature to overcome the disease, and restore health and vigour.

It may seem extraordinary that I make no mention of Virginian snake-root, contrayerva root, the volatile salts, camphire, musk, and other medicines that are used in the low state of the nervous fever;—all I have to say on that head is, that I have tried each of their powers singly, and compared them with those of Peruvian bark and wine, with all the attention I am capable of bestowing;

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the effect of which has been the strongest conviction on my mind, that none of them, nor any combination of them, are equal in efficacy to the bark and wine. An exception perhaps might be made in favour of musk, which when given in the quantity of at least a drachm in the course of a day, has a peculiar power of abating and removing the symptoms of subfultus tendinum and hiccup ; but even this effect is rendered more certain by giving wine at the same time ; and besides, whatever may be the powers of musk as an antispasmodic or diaphoretic, those of wine are infinitely greater as a cordial and restorative*.

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* In the fourth volume of the Medical Observations and Enquiries, there is a very accurate account of an epidemic distemper, by Dr. Sandeford, of Barbados, which he denominates a putrid remitting fever. Although I may not perfectly agree with that gentleman in some of the theoretical opinions he seems to have adopted, yet I find my own observations, respecting the little efficacy of the other medicines usually given in this fever, so strongly confirmed by what he observed in their use on that occasion, and also the powerful effects of the bark, that I am tempted to extract the following passage :

" Having now cleansed the first pailages, the next indication
 " to be fulfilled appeared to be that of checking and correct-
 " ing the putrescent state of the juices, and of co-operating with
 " Nature in eliminating the morbid matter through the proper
 " excretaries ; for which purpose the warm, cordial, alexipharmac
 " and antiseptic medicines seemed principally necessary ; but
 " though these had all the good effects that could be expect-
 " ed from them, in keeping up the *vis vitæ*, correcting the
 " humours, and assisting Nature in the expulsion of the mor-
 " bidic matter, *y t all these proved insufficient of themselves to effect*
 " a cure, until the use of the bark was introduced, the patient
 " often dissolving away under the violent profuse cold sweats,
 " until this medicine put an effectual check to them ; nay, so
 " singular was the efficacy of this medicine in this disease, that
 " I can truly say, I know of none that were cured without it ; and all
 " those who neglected to take it, however conformable they might have
 " been in other respects, were nevertheless often precipitated into the
 " danger of a dropsy or consumption : Of such indispensable use was
 " the bark in this disease !

" In

When a diarrhoea supervenes in such a degree as the patient cannot bear in his present low and weakened state, Sir John Pringle recommends some spoonfuls of chalk julep with opium, to be given after every loose stool. But it often happens that the patient will not take that medicine ; in such cases, a few drops of the tinctura Thebaica in a little warm wine, mulled with cinnamon and sugar, will have the same effect. Wine thus prepared is highly agreeable to the patient's taste, and if the diarrhoea continues obstinate, to the few drops of Thebaic tincture given after each loose stool, may be added a proportional quantity of tincture of ipecacuanha to render each dose of the nature of Dover's powder, and may be taken in mulled wine without being perceived by the patient. This addition renders the opiate more effectual in restraining the diarrhoea, and at the same time increases its diaphoretic quality.

Blisters,

" In my first use of this medicine, I blended it with the " alexipharmics, in the form of a decoction ; but as all the " good effects resulting from the mixture seemed principally owing " to the bark contained in it, I thought it was but just to give " it its due preference ; and accordingly afterwards administered " it alone, either in decoction or substance, as it seemed necessary.

" It is proper to remark particularly, that whereas most writers forbid the use of the bark absolutely, unless in the state of remission and intermission, I found it necessary to give it at any time of the disease indiscriminately ; and success justified the practice, the patient otherwise dissolving away irretrievably under the cold colliquative sweats he had perpetually upon him."

There perhaps cannot be a stronger instance of the influence that preconceived opinions have even upon enlightened minds, than what may be observed from the above extract. This gen'l man being perfectly persuaded that the blood and juices were in a putrid state, and that antiseptics of course were the antidotes, and that a morbid matter was to be expelled, thought he saw all this performed by medicines, which however he himself declares in no one instance stopped the disease, but which allowed the patient to dissolve away.

Blisters, although pretty generally condemned at the beginning of this fever, are recommended by many authors in the advanced state, and particularly in the case of stupor and low delirium. Those who recommend them, however, as happens almost constantly in medical matters, are of different opinions respecting their manner of acting. Those of the old school, who retain the idea of a morbific lensor in fevers, think the catharides are absorbed, and help to dissolve it ; others impute their good effects to the evacuation of serum, which, in their opinion, tends to produce a relaxation of the spasm of the extreme vessels ; some think they act by occasioning revulsion ; and a fourth class imagine they are of service only as stimulants.

I should have been happy to have found them of service, although the particular character in which they act had remained a secret ; but notwithstanding my having watched their effects with all the attention I am capable of, and formerly with a strong prepossession in their favour, I cannot assert that I ever knew vesicatorys of much use in any stage in this disease ; but I have frequently seen the patient teased by their irritating quality, without their seeming to have any other effect, and sometimes I have imagined they produced that distressing symptom described in page 240.

The duration of this fever is uncertain ; it may be thrown entirely off by the earliest evacuations and the antimonials ; or having stood them, its course may be abridged by the bark ; or, baffling the efficacy of all medicines, it may continue its progress to the end of the second week, and remain after what is called the low state has taken place, with no very considerable variation, for a week longer, and in some instances for two. When the disease is prolonged

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ed in this manner, it has been already said, that our principal object should be to prevent the patient from sinking ; an object which will be more certainly, though less scientifically accomplished by the seasonable administration of light palatable nourishment and wine, than by all the prescriptions with which the apothecary's file is too frequently loaded on such occasions.

I have declined mentioning many remedies that have been strongly recommended for particular symptoms, being convinced on what appears to me the best ground, that they have been cried up far above their desert, and that the most efficacious of them are inferior to the means recommended above.

There are complaints wherein it may be necessary to order medicines, merely for the purpose of amusing the imagination, and satisfying the prejudices of patients ; some of whom cannot conceive that a disease is to be cured without drugs, and seem to think it will be the sooner cured the faster they are swallowed ; but in the present situation the patient has no prejudices, but he still has a distinction of taste ; and if he is teased to swallow what he detests, it will put him from taking that cordial nourishment which is necessary for his support.

In very malignant cases, this fever ends fatally on or before the seventh day, but more frequently those who die are carried off about the middle or towards the end of the second week. When the patient survives the twentieth day, it rarely happens that he does not finally recover : When the fever terminates favourably before or at the end of the second week, the crisis is generally obvious ; but when that happens at a later period, particularly if after the third week, the favourable turn is less evident, and sometimes several days pass, during which the disease abates so gradually, that the most experienced are in doubt.

doubt whether it abates or not : At length, however, it becomes evident by a warm moisture being perceptible on the skin, by the dark-coloured gluey substance which adheres to the gums and lips, growing less tenacious, and being more easily removed ; by the stools regaining a natural colour ; by the urine being made in greater quantity, and depositing a sediment ; by a return of appetite, and by the pulse becoming slower than it was before the commencement of the disease.

When the fever has been of long duration, suppurations of the lymphatic glands of the neck or arm-pit sometimes take place at the decline. All that is necessary to be done in such cases, is to encourage the suppuration by the application of poultices.—They generally heal without difficulty after breaking, or being opened by the surgeon.

Although no such suppurations should take place, when this fever is of an uncommonly malignant nature, it always leaves a great degree of weakness behind it ; and there are instances of this imbecility not being confined to the body.

Many patients, particularly those advanced in life, are subject during their convalescence to swellings of the feet and ankles ; a symptom which for the most part disappears gradually as the strength returns ; but in case it is more obstinate, or increases and seems to threaten an anasarca *, it will be proper to give fifteen or twenty grains of the powder of jalap, rubbed with an equal quantity of nitre, or some purgative of the same nature, once a week ; and some gently diuretic medicine in the intervening days. Promoting the secretion of urine is found peculiarly useful for the removal of this symptom and its consequences. I have found nothing answer that intention better than pills formed of fresh squills and

* A particular species of dropsy.

and nitre, with a small proportion of species aromaticæ. While this swelling of the ankles continues, and of course an increase of the discharge by urine is to be wished, Rhenish is preferable to any other wine.

In all cases where the fever is unusually protracted, and leaves the patient in excessive weakness, the recovery is slow and precarious, and the greatest care is required to prevent any error in regimen during the convalescence, a very small degree of excess being then most apt to produce very troublesome consequences.

Food of easy digestion, taken in small quantity and repeated frequently, gentle exercise in a carriage when the weather is favourable, attention to prevent costiveness by some mild laxative, and the use of some light agreeable bitter, to assist digestion and prevent flatulencies, are the most approved means of promoting the return of the patient's strength.

I have now given the clearest and most intelligible idea which my reading, experience, and reflexion, such as they are, enable me to form of the nature of fevers, with what appears to me the best method of treating them ; happy if I have been able to add a small ray to the stronger lights thrown on this important subject by men of far brighter abilities.

T H E E N D.





